

621.3

No. 211.

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MUIRHEAD & CO.,

ELECTRICAL ENGINEERS

AND

CONTRACTORS.

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January, 1893.

ILLUSTRATED PRICE LIST.

MUIRHEAD & CO.,
ELECTRICAL ENGINEERS & CONTRACTORS
AND
MANUFACTURERS OF
ELECTRICAL & TELEGRAPHIC APPARATUS
OF EVERY DESCRIPTION.

ELECTRIC LIGHT

Central Stations and Private Installations designed and fitted up complete. Houses and Ships Wired.

Contractors for the Laying of Electric Light Mains, Electric Light Fittings, Switches, Switchboards, Measuring Instruments, &c., &c.

Apparatus for Duplex Telegraphy on Cables, with Dr. Muirhead's latest Improvements.

Material required in the construction and maintenance of Electric Telegraphs.

EXPERIMENTAL WORK CARRIED OUT.

Manufacturers & Contractors for the supply of Apparatus for Submarine Cable Stations and Cable Repairing Ships.

MUIRHEAD & Co, STOREY'S GATE, WESTMINSTER, S.W.

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— — —

ANGLO-AMERICAN TELEGRAPH COMPANY.

AFRICAN DIRECT TELEGRAPH COMPANY.

BRAZILIAN SUBMARINE TELEGRAPH COMPANY.

CENTRAL & SOUTH AMERICAN TELEGRAPH COMPANY.

COMMERCIAL CABLE COMPANY.

COMPAGNIE FRANCAISE DU TELEGRAPHE DE PARIS
A NEW-YORK.

DIRECT SPANISH TELEGRAPH COMPANY.

DIRECT UNITED STATES CABLE COMPANY.

EASTERN TELEGRAPH COMPANY.

EASTERN EXTENSION TELEGRAPH COMPANY.

EASTERN & SOUTH AFRICAN TELEGRAPH COMPANY.

WESTERN UNION TELEGRAPH COMPANY.

WEST INDIA & PANAMA TELEGRAPH COMPANY.

10 90-B5958 TCF

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SECTION I.

LAND LINE MATERIAL & APPARATUS FOR LAND LINE STATIONS.

IRON POLES AND WIRE.

- 1.—Blomfield—Muirhead's Tubular Wrought
Iron Tapered Telegraph Pole, with cast
iron stiffeners, and with two cast iron foot
plates, complete. In all lengths

Ditto ... ditto, with cast iron base ...

*These Poles are specially designed to suit the requirements of the
Colonies and countries where transport is difficult and costly.*

- 2.—Muirhead's Tubular Wrought Iron Pole,
with wrought iron or steel liner, and with
cast iron base, plain or ornamental, complete.
In lengths from 18 feet upwards

- 3.—Ditto, ditto, galvanized, for fixing on housetops
and for telephone lines, in one two or three
lengths

- 4.—Siemens' Iron Telegraph Pole, with cast
iron base and Mallet's buckled wrought iron
foot plate, complete

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

BRACKETS, POLE ROOFS, STAYS, ETC.

- 5.—Muirhead's Malleable Cast Iron Tubular
Bracket, galvanized, for wooden poles,
screws or nails, complete, $4\frac{1}{2}$ in. long ... each 0 0 8
- 6.—Ditto ... ditto, 6 inches long ... „ 0 0 10
- 7.—Muirhead's Malleable Cast Iron Tubular
Bracket, for iron poles, with back strap,
bolts and nuts, complete ... „ 0 1 0
- 8.—Ditto ... ditto, in pairs for two insulators,
connected together with bolts and nuts,
complete ... „ 0 1 6
- 9.—Bracket or Stem in Wrought Iron, with
thread at end for screwing into wood ... „ 0 0 7
- 10.—Malleable Cast Iron Brackets, solid, gal-
vanized, for square or round wooden poles,
with screws ... „ 0 0 9
- 11.—Wooden Arm, of oak or teak with galvanized iron
clip, bolts, & nuts, for attachment to iron poles „ 0 1 6
- 12.—Wooden Arm, with long galvanized bolt, nut
and washers, for attachment to wood poles ... „ 0 1 0
- 13.—Saddles, of malleable cast iron, for an insulator
on the top of a pole, with screws ... „ 0 0 9
- 14.—Wall Bracket, of malleable cast iron, galvan-
ized, for brickwork, stone, or wood, length of
arm 4 inches or 6 inches for one wire from 0 0 10 to 0 1 0
- 15.—Malleable Cast Iron Bracket, solid, gal-
vanized, for square or round wood poles, with
screws complete. ... each 0 0 9
- 16.—Ditto ... ditto, double for 2 wires ...
- 17.—Ornamental Wall Brackets, in iron, for
carrying many wires ...
- 18.—Pole Roofs, of galvanized iron, with nails ... „ 0 0 4

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

19.—Ditto	ditto, of zinc, with nails	...	...	...	from	0	0	6
20.—Ditto	ditto, of cast iron	...	...	...	each	0	0	10
21.—Ditto	ditto, of earthenware	...	...	...	,,	0	0	10
22.—Wire Guards, and Hoop Guards, of gal-	vanized iron	...	...	...	,,	0	0	4
23.—Wire Stays, stranded galvanized iron wire	...							
24.—Stays, with rods, earth plates and clips complete						0	3	6
25.—Stay Rods, fitted with nuts complete, galvanized					from	0	0	6 to 0 0 9
26.—Union Swivel or Stretching Screw, gal-	vanized iron	...	...	...		0	3	6
27.—Cast Iron Chairs, for supporting iron poles on	roofs of buildings	...	...	...	each	0	10	0
28.—Pole, Bolts and Nuts, galvanized or plain					at per cwt.	1	10	0
29.—Iron Staples	...	...	...	...

The above prices are subject to fluctuations.

INSULATORS.

30.—Single Bell Insulator, porcelain or brown stoneware, with galvanized iron bolt and nut	each	0	0	8
31.—“Z” Insulator, in brown stoneware or porcelain, with No. 8 galvanized iron shoulders, bolt and nut	„	0	0	8
32.—Ditto ... ditto, with galvanized iron curved stem for screwing into wood	„	0	0	10
33.—Clark's Double-bell Insulator, in either porcelain or brown stoneware, with galvanized iron shouldered bolt and nut	„	0	1	1
34.—Ditto ditto, smaller size	„	0	0	10
35.—Varley's Double Bell Insulator, in brown stoneware, with galvanized iron shouldered bolt and nut, No. 8 size	„	0	0	8
36.—Andrew's Sheathed Insulator, in porcelain or stoneware, fitted with galvanized iron bolt and nut, No. 8 size	„	0	1	0
37.—Terminal Insulator, in porcelain or stoneware, consisting of a stout umbrella shaped Insulator, with shouldered bolt, nut, and washers, complete	„	0	1	10
38.—Double Bell Brown Stoneware Telephone Insulator, with galvanized iron stem for square poles	„	0	0	7
39.—Bright's Single Shackle Insulator, of porcelain or stoneware, with galvanized iron straps and bolts	„	0	1	1
40.—Bright's Double Shackle Insulator, in porcelain or brown ware, fitted with galvanized iron straps and bolts complete	„	0	1	10

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

41.—Iron-hooded Insulator, consisting of a single bell porcelain insulator, protected by a malleable cast iron hood, plain or perforated, with lugs for wire, galvanized, and fitted with galvanized iron shouldered bolt and nut ...	each	0	1	6
42.—Iron-hooded Insulator, consisting of a double bell porcelain insulator, protected by a galvanized malleable cast iron hood, plain or perforated, with steel or wrought iron stem, galvanized	„	0	1	9
43.—Siemens' Insulators, with malleable cast iron hood, for wood poles, intermediate size ...	„	0	2	0
43A. Ditto, with malleable cast iron hood for iron pool, intermediate size... ..	„	0	2	3
44.—Johnson & Phillips' Fluid Insulators, various				
45.—Brooks's Insulator	„	0	2	0
46.—American Glass Insulator	„	0	0	6
47.—Oppenheimer's Insulator, porcelain ...	„	0	1	2
48.—Swinging Insulators, Von Chauvin's, in porcelain or ebonite, with iron hook for suspension to trees	„	0	2	3
49.—Cordeaux's Insulator	„	0	1	0

TOOLS.

50.—Complete Set of Telegraph Construction Tools, fitted in a Travelling box, for the erection of land lines of either iron or wooden poles per set	20	0	0
51.—Case of Jointer's Tools, consisting of jointing irons, pliers, lamp, &c., for making joints in gutta percha and india rubber covered wires, fitted in teak case, with leather strap ...	3	15	6

52.—Case of Tools for Instrument Repairing, consisting of files, hammers, pliers, hand vice, screw drivers, stocks and drills, brushes, emery paper, solder, oil, and tools required for the repair of telegraph instruments, fitted in either a plain deal or a polished teak case	3 10 6
52A. Tool for twisting wire at joints... ..	0 17 6
53.—Wire Drum and Barrow, light and portable, for paying out line wire	3 0 0
54.—Earth Borers, Marshall's, small size or large size from 2 10 0 to 5 0 0	
55.—Ditto Selig's	1 15 0
56.—Wire Strainer, with chain and Dutch tongs, complete each	4 10 0
57.—Dutch Draw Tongs „	0 10 6
58.—Draw Vice and Key „	1 1 0
59.—Blocks and Falls „	1 1 0
60.—Soldering Materials, Solder, Soldering Solu- tion in suitable bottles, Sal Ammoniac, &c.	
61.—Soldering Tools, Fire Pots, Muffs, Fletcher's Soldering Iron, &c.	

Pick Axes, Shovels, Earth Rammers, Cutting Pliers,
Cutting Nippers, Soldering Irons, Fire Pots, Ladders
(Steel or Wooden), Surveying Chains, Earth Scoops or
Spanish Spoons, Crow Bars, Hand Saws, Hammers,
Spanners, Files, Satchels, Blasting Tools, and all other
Tools and accessories supplied.

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

APPARATUS FOR LAND LINE STATIONS.

NEEDLE INSTRUMENTS, MORSE INSTRUMENTS, RELAYS, ETC.

- 62.—Single Needle Instrument, in teak case, with drop handle and fitted with either Spagnoletti's or Varley's induced coils ... each 4 10 0
- 63.—Single Needle Instrument, in teak case, pedal key commutator, and fitted with either Spagnoletti's or Varley's induced coils ... „ 5 0 0
- 64.—Neale's Single Needle Instrument, with induced dial and sounders
- 65.—Spare Dial, for Single Needle Instruments, with either Spagnoletti's or Varley's induced coils, fitted in teak case
- 66.—Pedal Key Commutator, Post Office form, for Single Needle Instruments
- 67.—Morse Instrument or Direct Inker, mounted on polished teak base with paper wheel in a drawer underneath, key, and galvanoscope, for terminal stations
- 68.—Ditto ... ditto, with an extra galvanoscope, and a plug switch for intermediate station, polarised relay, and plug switch complete ...
- 69.—Morse Instrument, fitted with key, galvanoscope, and commutator, complete, for translating stations
- 70.—Paper Wheel, on Stand, for Morse Paper 0 12 9
- 71.—Sounder, G.P.O. pattern 2 0 0

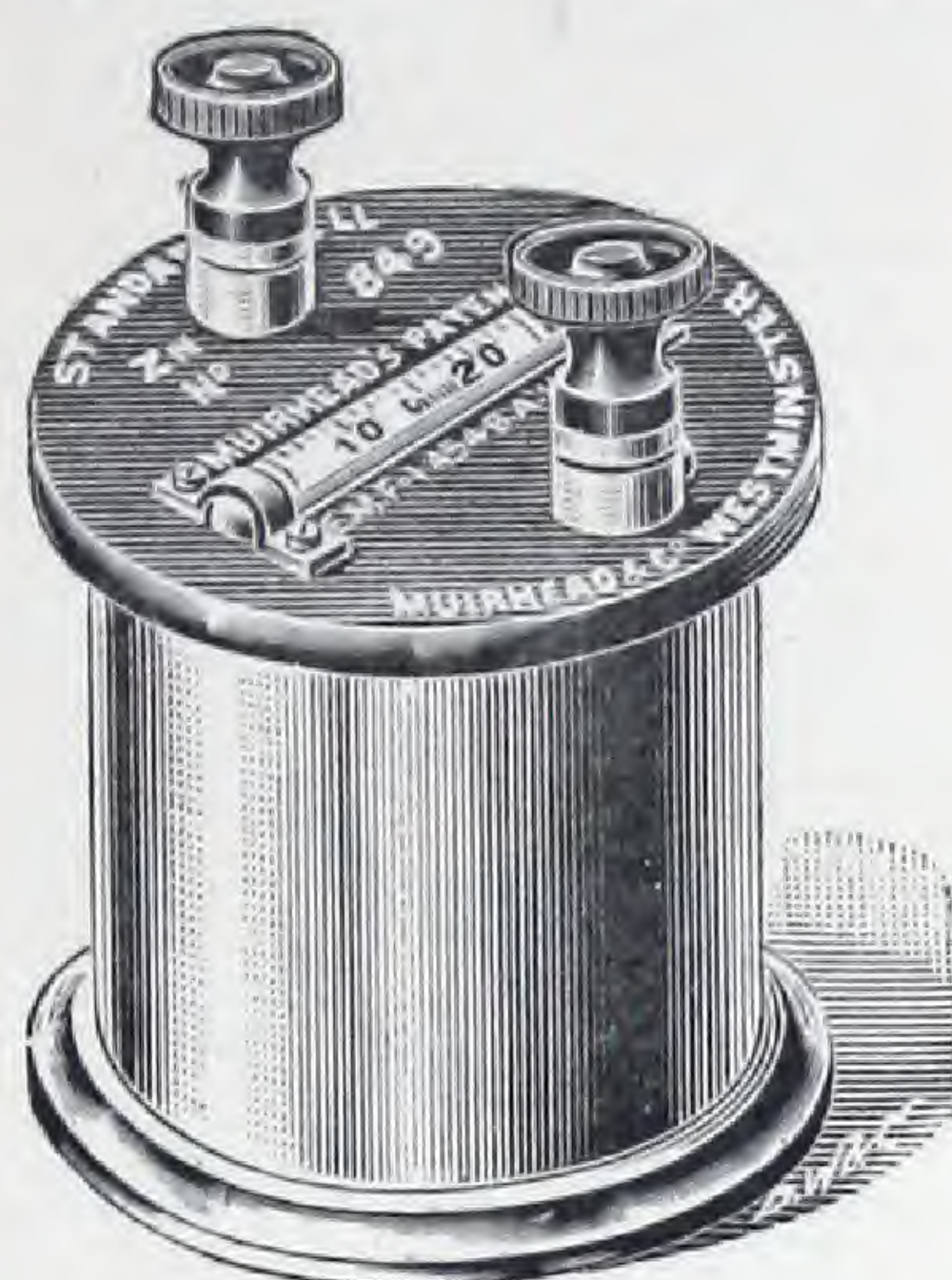
MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

72.— Sounder , War Office Pattern, on polished teak base, and fitted with galvanoscope, switch, and key, complete	5 10 0
73.— Portable Sounder , War Office pattern, with key and galvanoscope, complete, in leather case, with shoulder strap	3 10 0
74.— Wheatstone's Automatic Recording Instrument , for high-speed telegraphy ...	
75.— Wheatstone's Transmitter , for above ...	
76.— Morse Instrument , with Herring's improved system of Inker, as used by the Anglo-American Telegraph Company	27 0 0
77.— Post Office Standard Relay , wound differentially for duplex working	5 10 0
78.— Soft Iron non-Polarised Relay , for quadruplex working	5 5 0
79.— Siemens' Relay	5 5 0
80.— Allan and Brown's Relays , for land lines, small size	9 10 0
81.— Pole Changer , P.O. form	8 0 0
85.— Morse Ink , per dozen bottles	0 6 0
86.— Instrument Oil , for Morse and other instruments, per dozen bottles	0 7 6
87.— Morse Paper , $\frac{3}{8}$ inch wide, white or green, per 100 rolls	1 14 0

SECTION II.

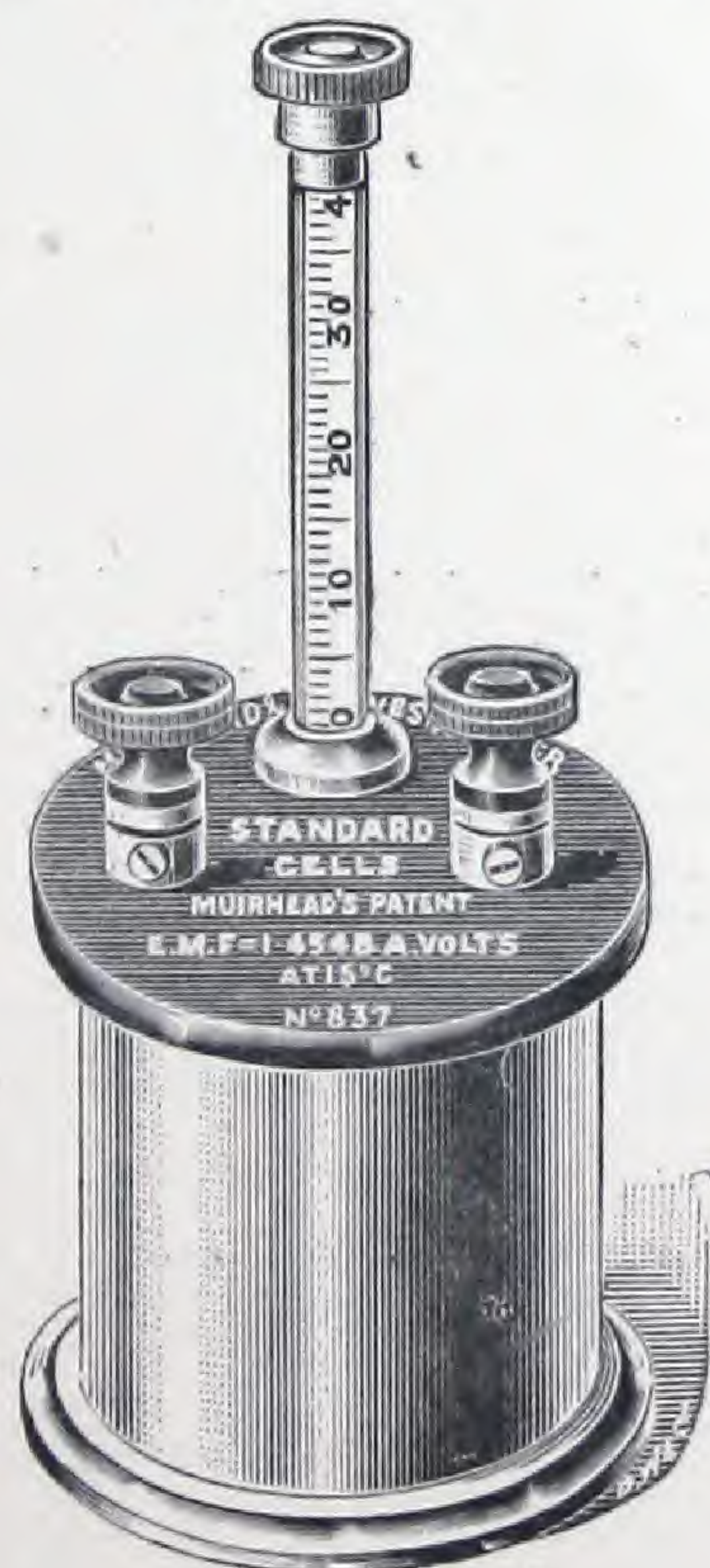
STANDARD CELLS.

- 90.—Muirhead's Patent portable form of
Clark Standard Cell, in circular brass
case, with thermometer 1 15 0



90.

- 91.—Ditto, with upright thermometer 1 15 0



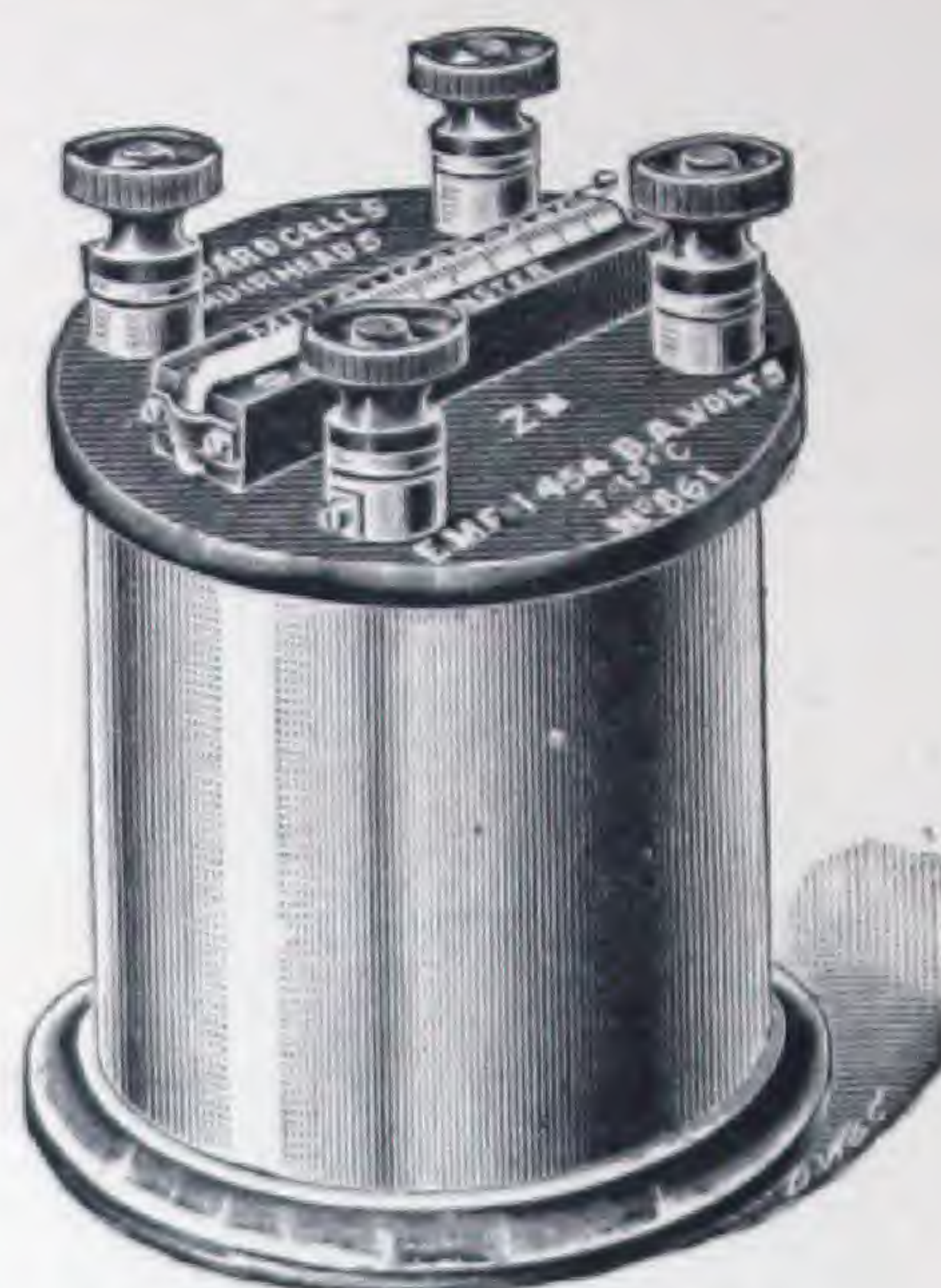
91.

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

- 92.—Two of Muirhead's Patent portable form
of Clark Standard Cell, in circular brass
case, with thermometer fig.

2 10 0

*This form is capable of being transmitted by
post without injury to the cells.*



92.

- 93.—Set of thirty-six Muirhead's Standard
Cells, with specially designed commutator
mounted on ebonite slab, in teak case, with
cover, as supplied to the Board of Trade ...

26 0 0

- 94.—Set of seven Muirhead's Standard Cells,
giving an E.M.F. of 10 legal volts at 20° cent.

*Certificates of value, signed by Dr. Muirhead, are
sent with all Standard Cells.*

- 95.—Clark's Standard Cell, Rayleigh pattern ...

1 10 0

- 96.—Daniell Cell, Dr. Fleming's pattern

5 0 0

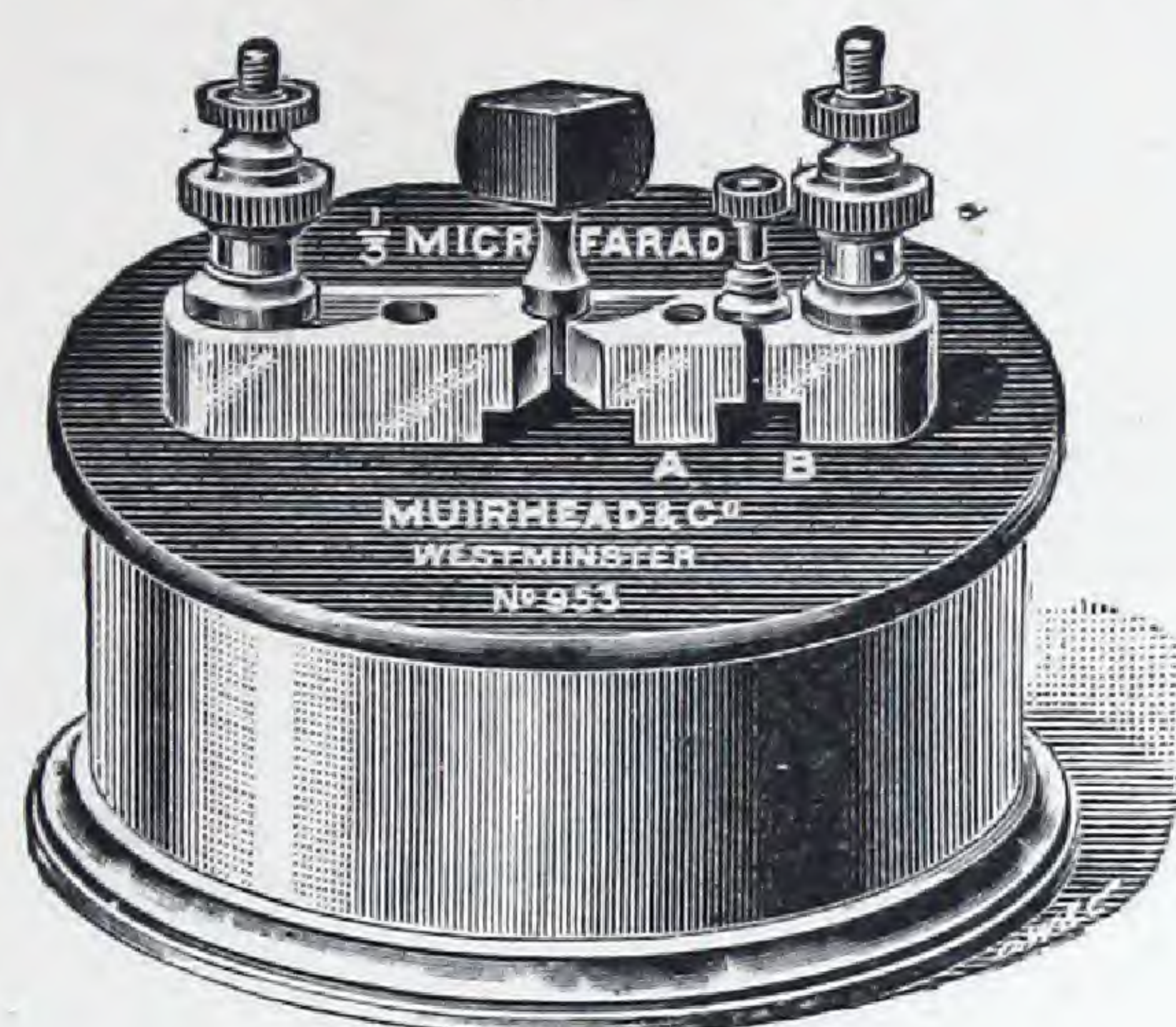
- 97.—Ditto, P.O. pattern

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

CONDENSERS.

- 100.—**Standard Condenser**, in circular brass case, ebonite top and short-circuit plug; capacity $\frac{1}{3}$ microfarad fig.

7 10 0



100.

- 101.—Ditto, $\frac{1}{2}$ microfarad

9 10 0

- 102.—Ditto, 1 „

12 10 0

Standard Condensers Nos. 100, 101, and 102, are sub-divided each into two parts A and B, the exact values of which are given in the certificates sent out with the instruments.

- 103.—Ditto, 1 „ divided into 2 equal parts

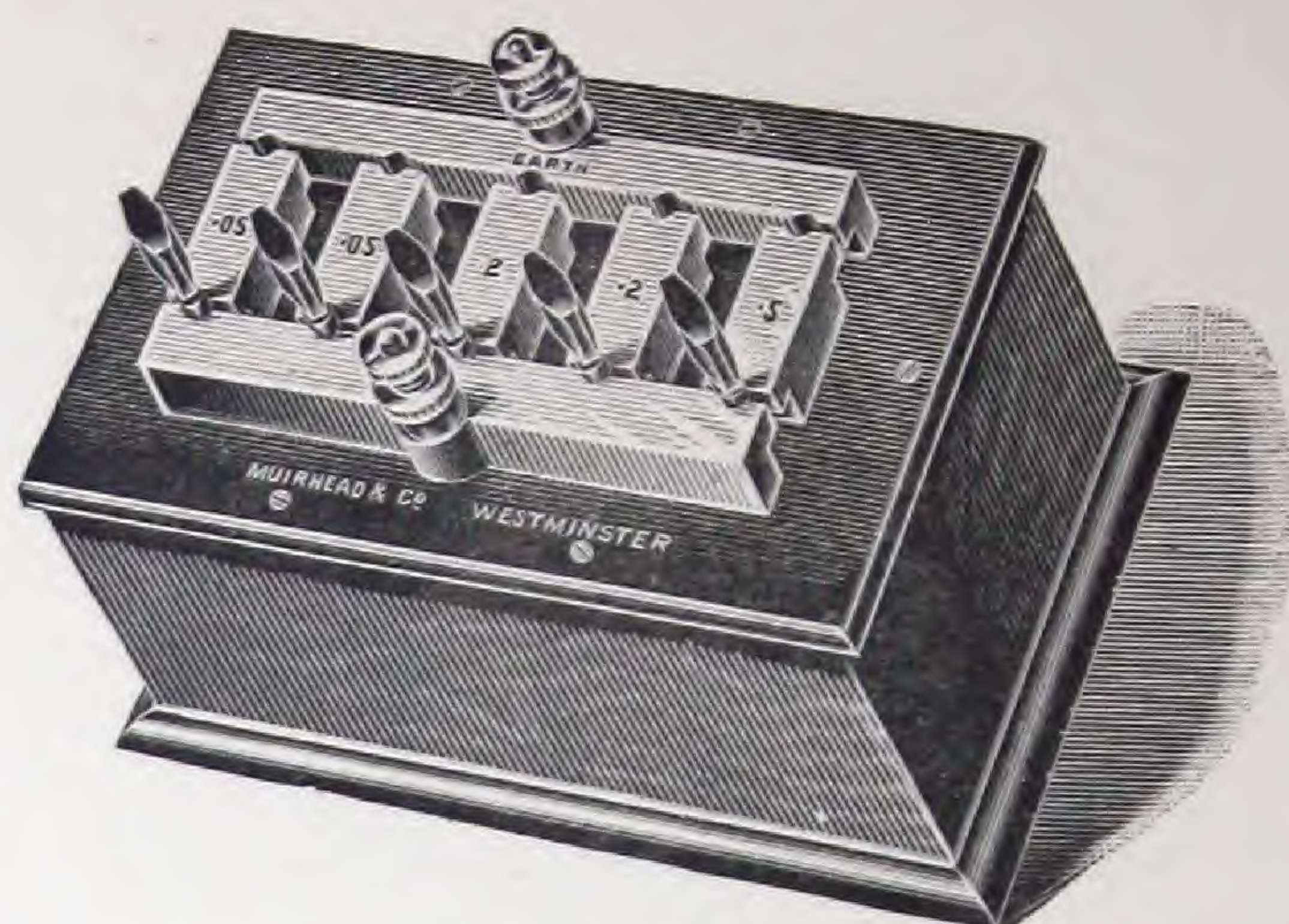
13 10 0

- 104.—Ditto, 1 „ sub-divided into four parts
(.1, .2, .3, .4), with Sir Wm. Thomson's circular commutator

17 0 0

- 105.—**Condenser**, 1 microfarad, subdivided into five parts (.05, .05, .2, .2, .5), with plug commutator

14 10 0



105.

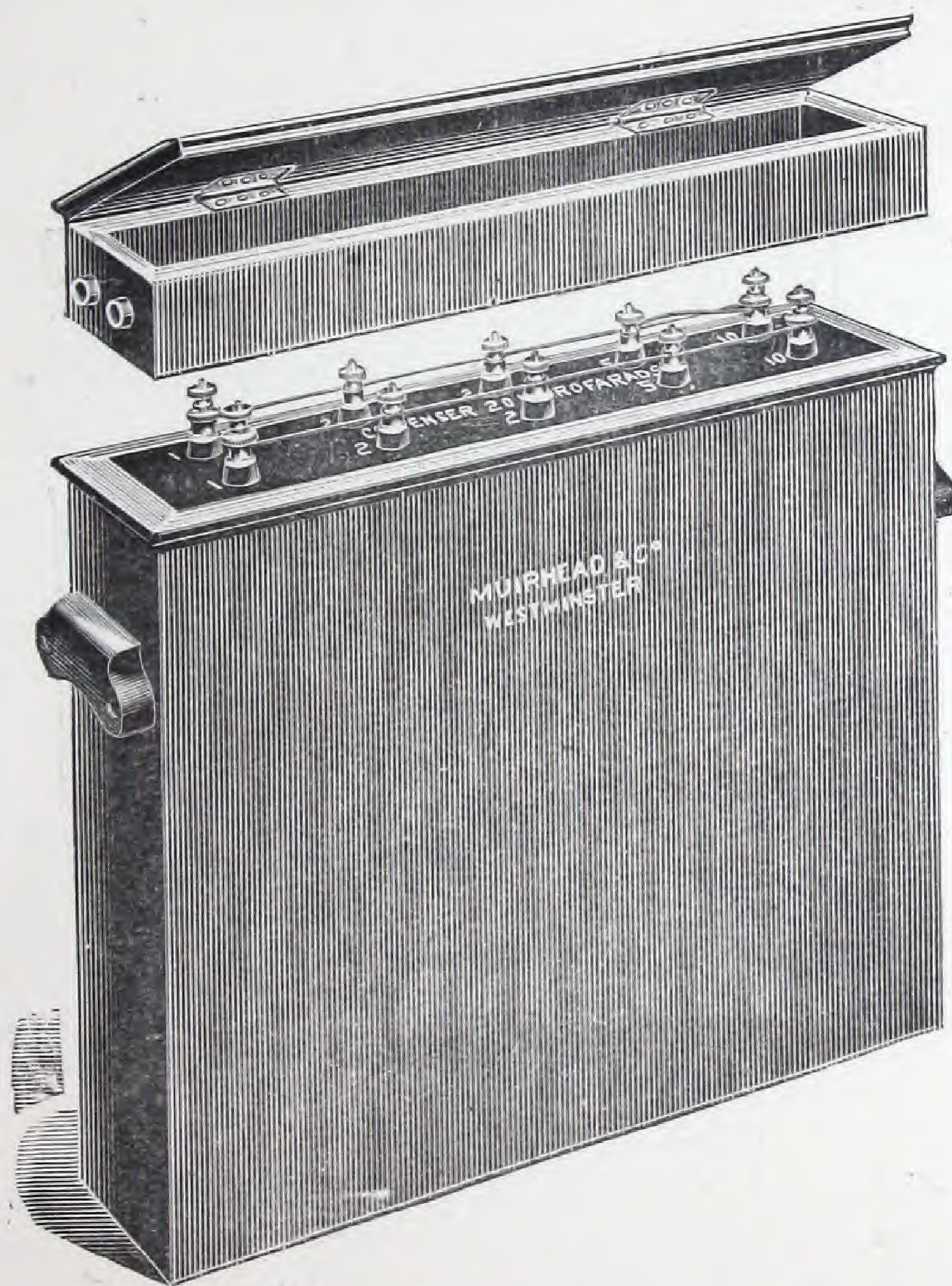
- | | |
|---|---------|
| 106.—Condenser, as No. 105, with brass blocks,
mounted on ebonite pillars | 16 10 0 |
| 150.—Condenser, 1 microfarad, with twelve sub-
divisions ($\cdot 001$, $\cdot 002$, $\cdot 002$, $\cdot 005$, $\cdot 01$, $\cdot 01$, $\cdot 02$,
$\cdot 05$, $\cdot 1$, $\cdot 1$, $\cdot 2$, $\cdot 5$) | 28 0 0 |
| 151.—Ditto, with the brass blocks on ebonite pillars ... | 32 0 0 |
| 155.—Slide Condenser, for use in Muirhead's sys-
tem of duplex working on sub-marine cables
from £18 to | 40 0 0 |



155.

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

- 160.—**Standard Air Condensers**, as used by Dr. Muirhead and the Electrical Standards Committee of the British Association
- 165.—**Sub-divided Condenser**, with plug commutator, for duplex and quadruplex working on land lines. Total capacity $7\frac{1}{4}$ microfarads (2, 1, .5, .25, 2, 1, .5 M.F. sub-divisions, Post Office pattern.. from 7 10 0
- 166.—**Condensers of high insulation**; capacity 20 microfarads in ten equal parts, in strong teak cases, with removable covers and hinged lids 52 10 0
- 167.—Ditto, sub-divided into five parts (1, 2, 2, 5, 10) 50 0 0



167.

- 168.—Ditto, capacity 10 microfarads, sub-divided into four parts (1, 2, 2, 5) 30 0 0

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

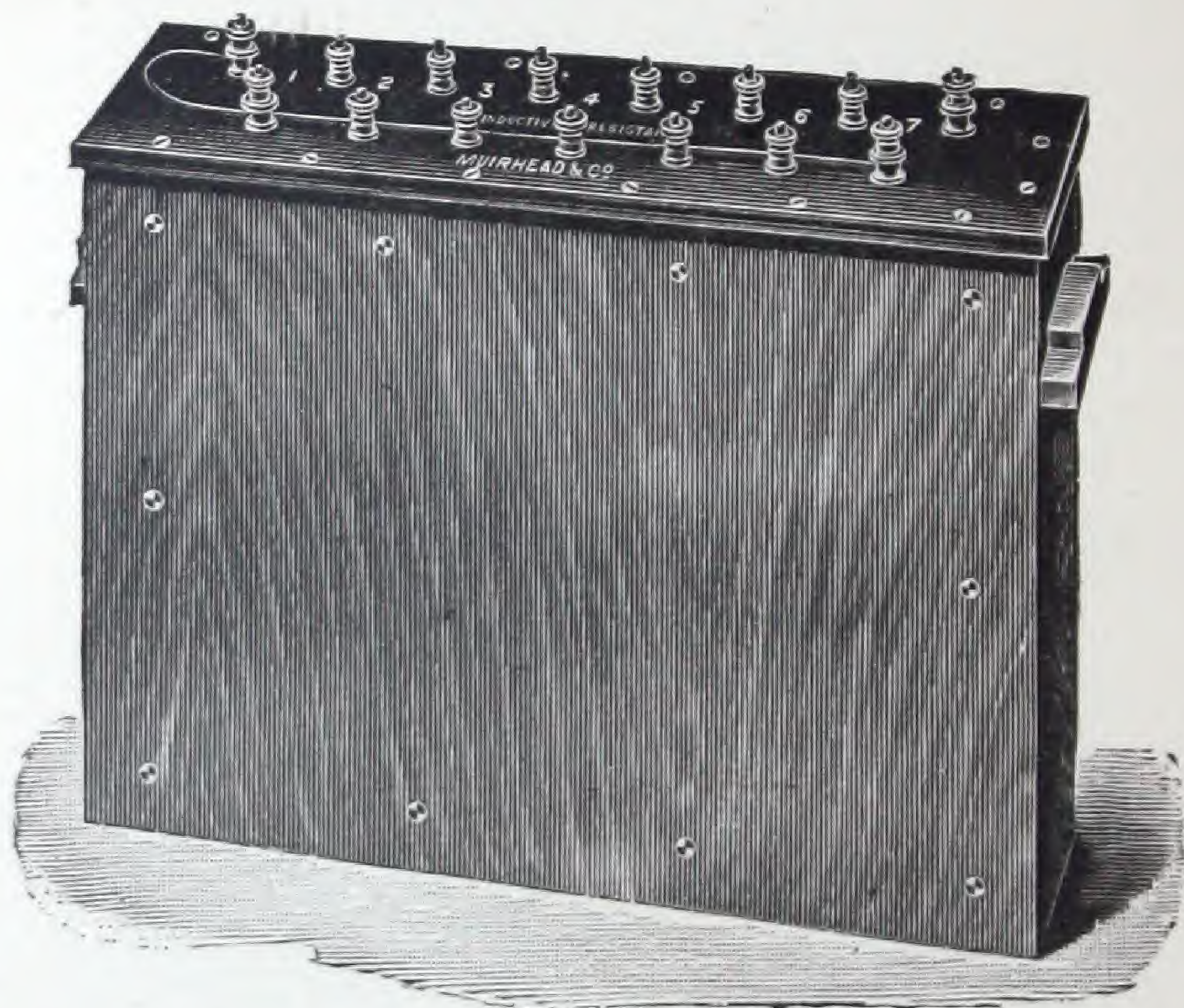
- 169.—**Condensers**, for use with telephone transmitters from 15/-

Condensers made to order, of whatever capacity and sub-division required.

Dr. Muirhead's Certificate is sent with all Standard Condensers.

ARTIFICIAL LINE FOR DUPLEX TELEGRAPHY.

- 170.—**Muirhead's Inductive Resistance or Artificial Cable**, made to order to any required ratio of conductor resistance to capacity, for use in Muirhead's system of duplex telegraphy on submarine cables ...



170.

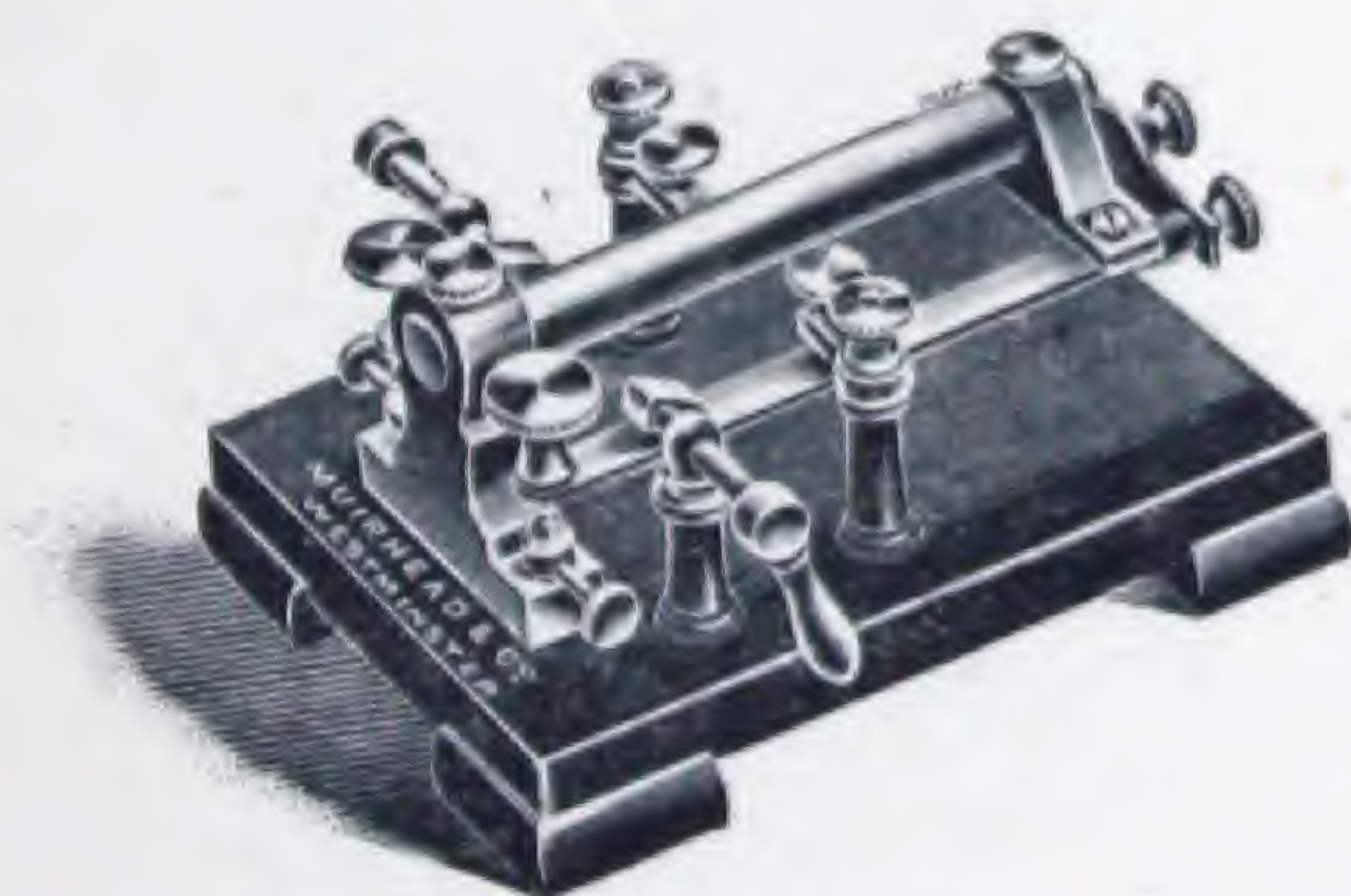
- 171.—Ditto, with double conductor for duplex-balancing in cases of multiple-cored cables (two or more cores inside same sheathing)
- 172.—**Varley's Artificial Line**, as supplied to the Anglo-American Telegraph Company, Limited
- 173.—**Artificial Lines for Educational purposes**, made to any specification

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

SECTION III.

ELECTRICAL TESTING KEYS & SUNDRIES.

215.—Discharge Key, Lambert's	...	...	...	2	5	0
216.—Ditto, more useful form, with cams, and extra contacts	...	...	...	3	10	0

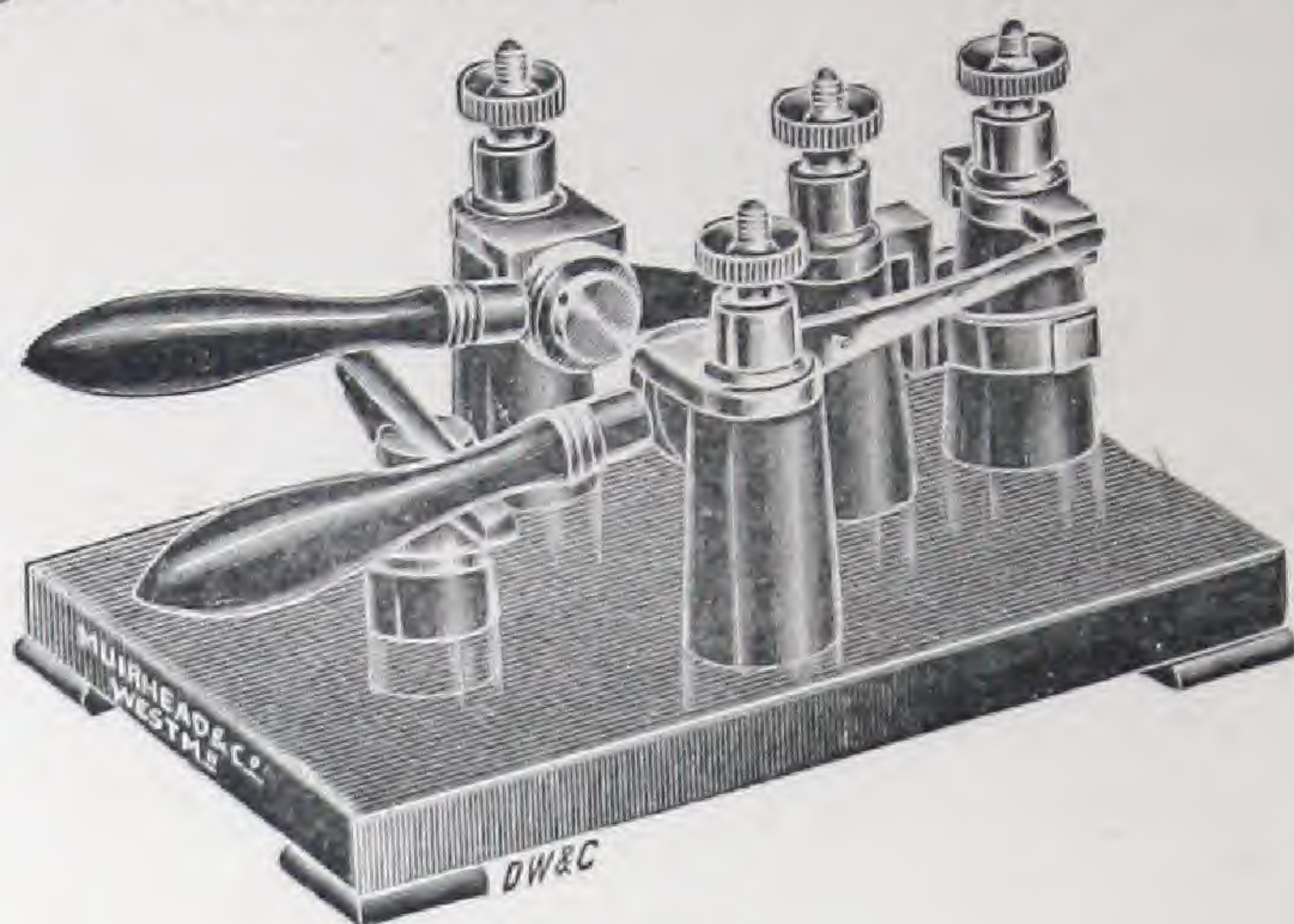


216.

217.—Ditto, Sabine's	...	...	...	...	3	3	0
218.—Ditto, Webb's (trigger)	...	...	...	...	3	10	0
219.—Ditto, Kempe's	...	...	...	...	5	0	0
220.—Charge and Discharge Key	...	...	...	...	2	15	0

MUIRHEAD & Co, STOREY'S GATE, WESTMINSTER, S.W.

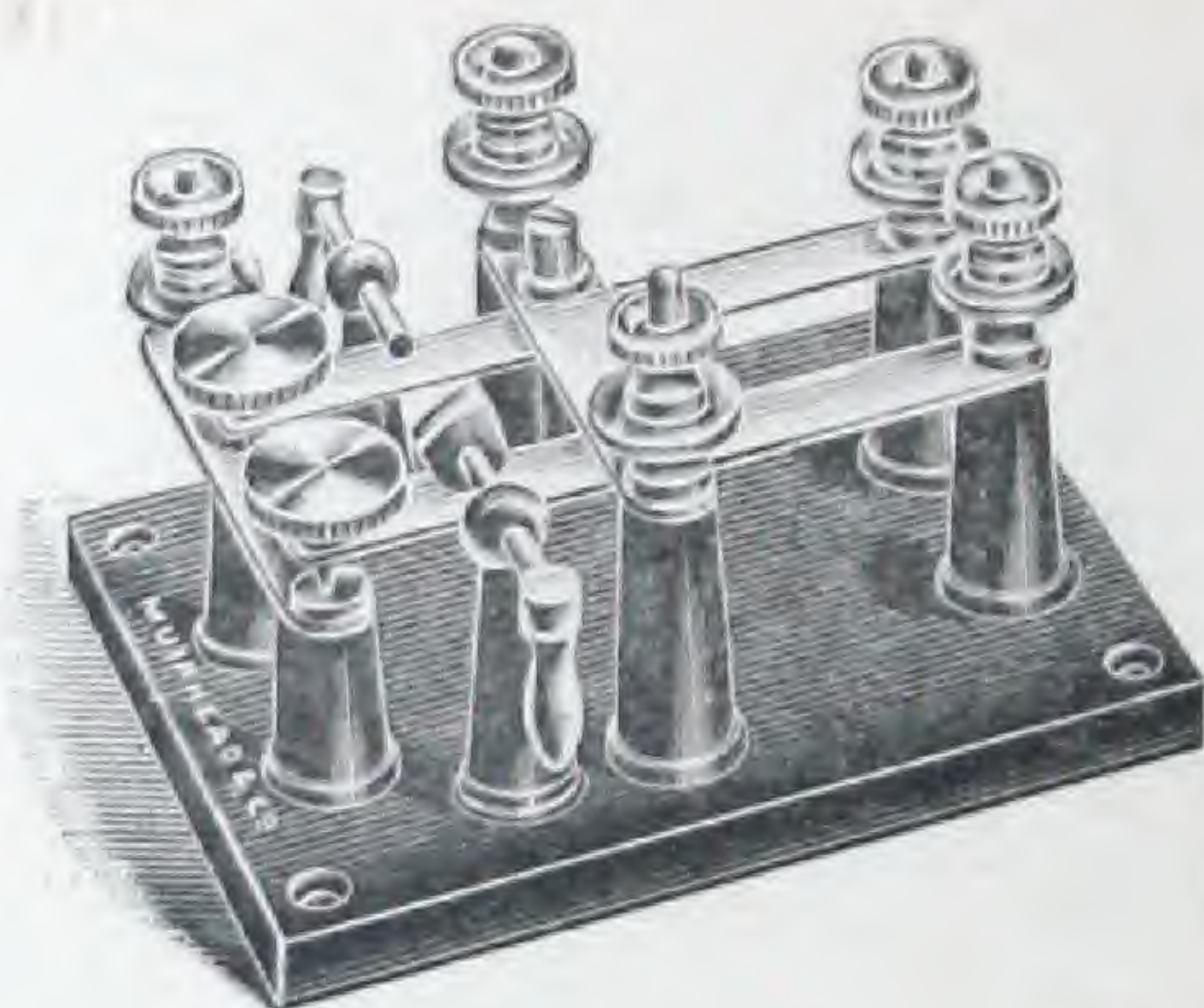
- 230.—**Battery Reversing Key**, Saunders', specially
designed for cable testing 7 10 0



230.

- 231.—**Reversing Key**, Varley's 3 0 0

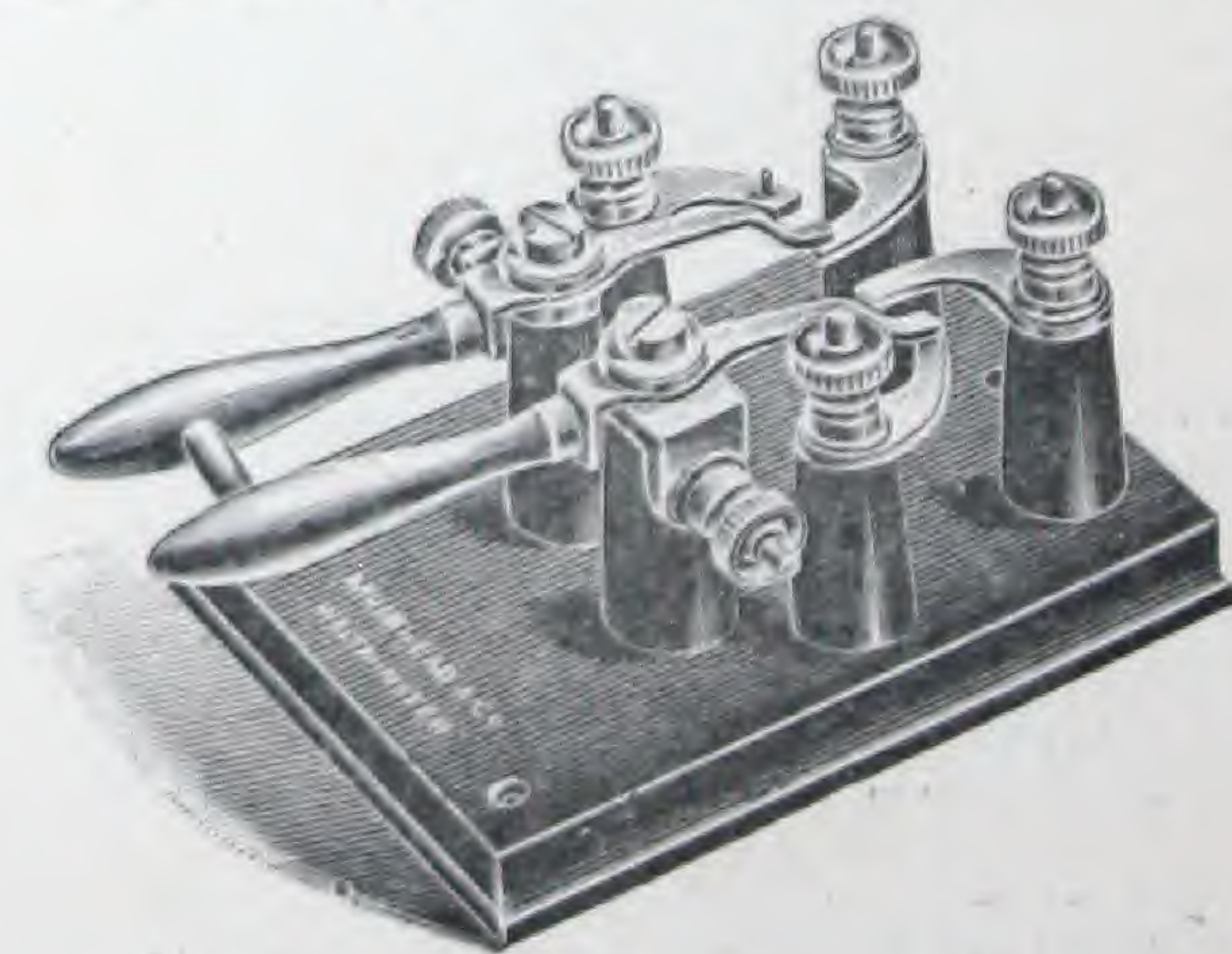
- 232.—**Ditto**, on ebonite pillars, with cams from 3 10 0



232.

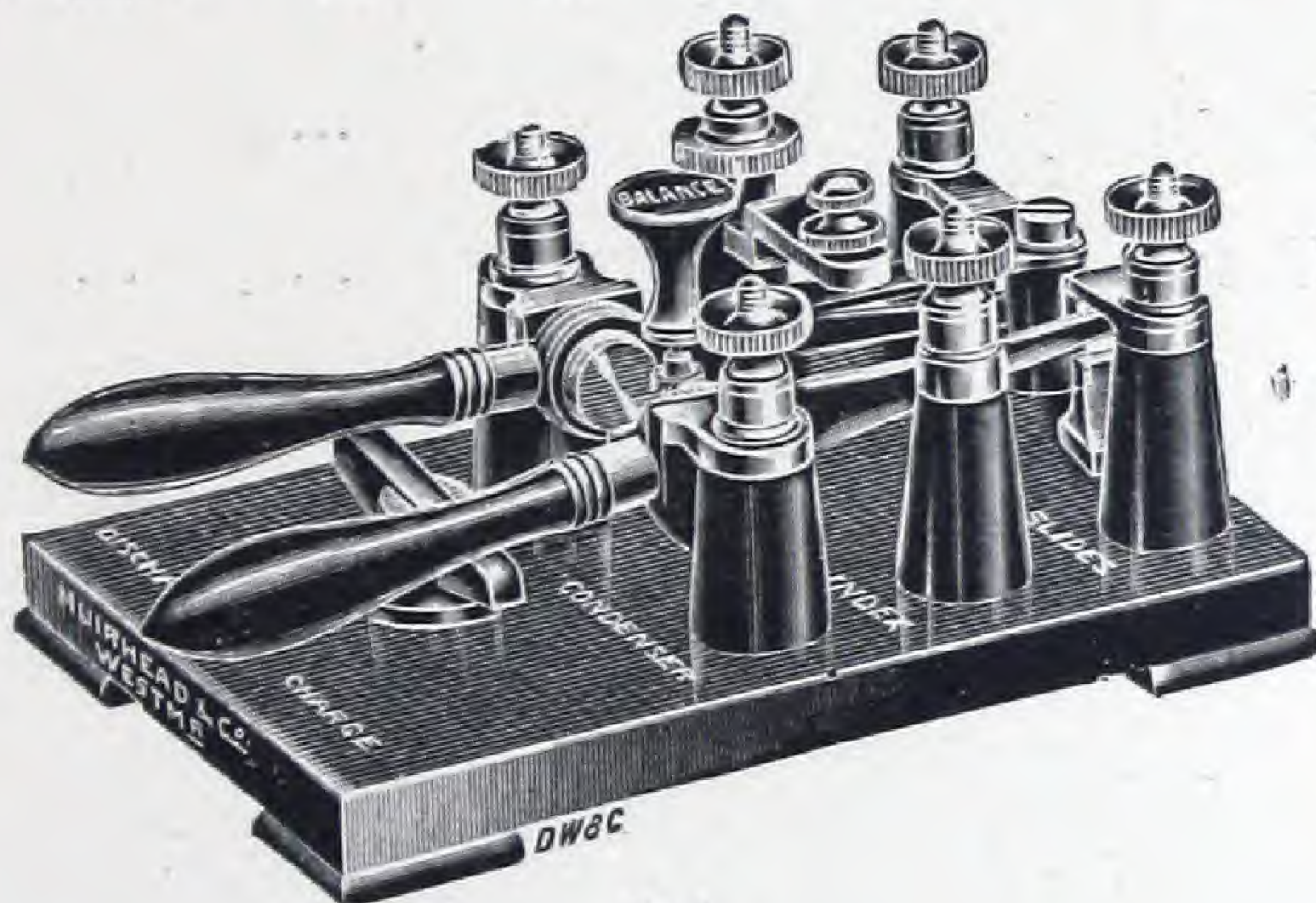
- 233.—**Reversing Key**, ditto, with plugs on bridge
pieces 4 5 0

- 234.—**Reversing Key**, with rubbing contacts,
useful also for charge and discharge tests ... 6 10 0



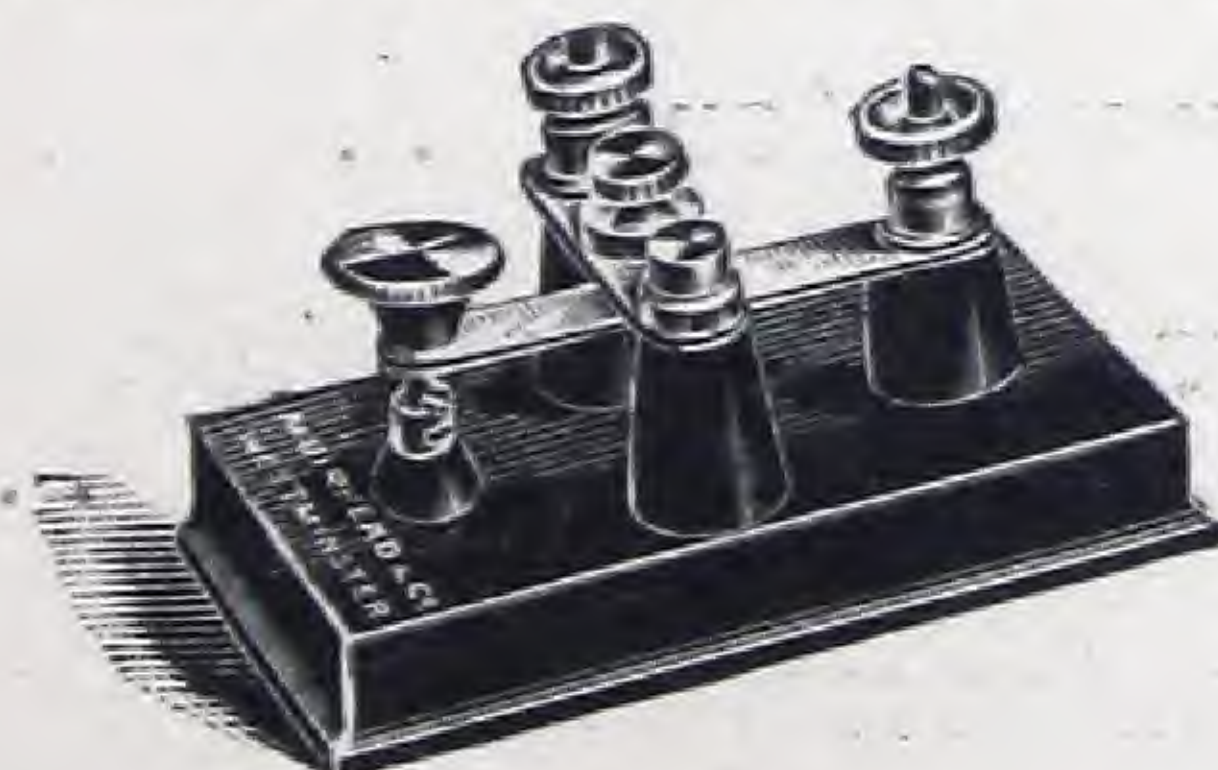
234.

- 235.—**Reversing Switch**, Sharpey Seaton's, for simultaneously reversing galvanometer and battery, useful for rapid testing of cables ... 8 0 0
- 236.—**Reversing Key**, Thomson's, for use with electrometers ... from 2 10 0 to 4 0 0
- 237.—**Rymer Jones's Testing Key** ... 4 15 6
- 238.—**Saunders' Galvanometer Reversing Key** with short-circuiting key combined ... 8 10 0
- 240.—**Bridge Key** (Battery Key and Galvanometer Key combined), mounted on ebonite base, B.A. pattern ... 1 17 6
- 241.—Ditto ... ditto, cheap form, on wood base ... 0 7 6
- 242.—Ditto ... ditto, Graham's pattern ... 1 15 6
- 251.—**Capacity Key**, Saunders'; specially designed for Muirhead's capacity test, and useful for other tests ... 9 10 0



251.

- 252.—**Capacity Key**, Lambert's, for Thomson's capacity test ... 6 5 0
- 265.—**Short Circuiting Key**, on ebonite base ... 1 15 0
- 266.—Ditto ... ditto, with contacts, on ebonite pillars 2 10 0



266.

267.—Webb's Short Circuiting Key, with trigger catch, large	...	...	...	...	...	3 15 6
273.—Single Plug Key	...	...	...	...	...	0 15 0
274.—Ditto	...	ditto, on ebonite pillars with capped plug and long handle	...	...	...	1 10 0
281.—Double Plug Key	...	...	...	...	...	0 17 0
282.—Ditto, on ebonite pillars, &c.	...	...	...	...	...	1 7 0
295.—Morse Key	...	...	from £1	0 0 to	...	2 0 0
296.—Mercury Key	...	...	...	...	...	0 15 0
297.—Friction Key, Du Bois-Reymond's	...	...	...	...	...	1 10 0
298.—Battery Commutator, or Single-way plug switch (a short circuit piece on ebonite base, with plug)	...	...	...	...	... <i>from</i>	0 12 6
299.—Ditto, Two-way plug switch, on ebonite base	...	...	...	...	... "	0 16 6
300.—Ditto, Three-way	...	...	...	...	... "	1 1 0
301.—Ditto, Four-way	...	...	...	...	... "	1 6 0
302.—Ditto, Six-way	...	...	...	...	... "	2 0 0
<i>302 x - " - With double terminal & extra Ebonite base as shown in Fig 302 x } 2-15-6</i>						
						
302. <i>x</i>						
303.—Ditto, Eight-way	...	...	...	...	... <i>from</i>	2 10 0
<i>303 x - " - as Fig 302 x -</i>						<i>3-10-0</i>
304.—Mercury Commutator	...	...	...	...	...	3 5 0
305.—Rocking Mercury Commutator, or Pohl's Wippe Commutator	...	...	...	...	...	0 17 6
306.—Swiss Commutators, according to number of bars	...	...	...	...	from £1 to	10 0 0

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

- 307.—**Battery or Galvanometer Reverser**, four
double terminals mounted on four ebonite
pillars, with two ebonite headed plugs ... 2 0 0
- 308.—**Double Terminals**, mounted on ebonite
pillars, with ebonite base, for cable connections
- 309.—Ditto, on brass plates, for earth connections ...

— — — —

Battery Switches of any number of plug pieces made to order.

— — — —

SECTION IV.

LIGHTNING PROTECTORS.

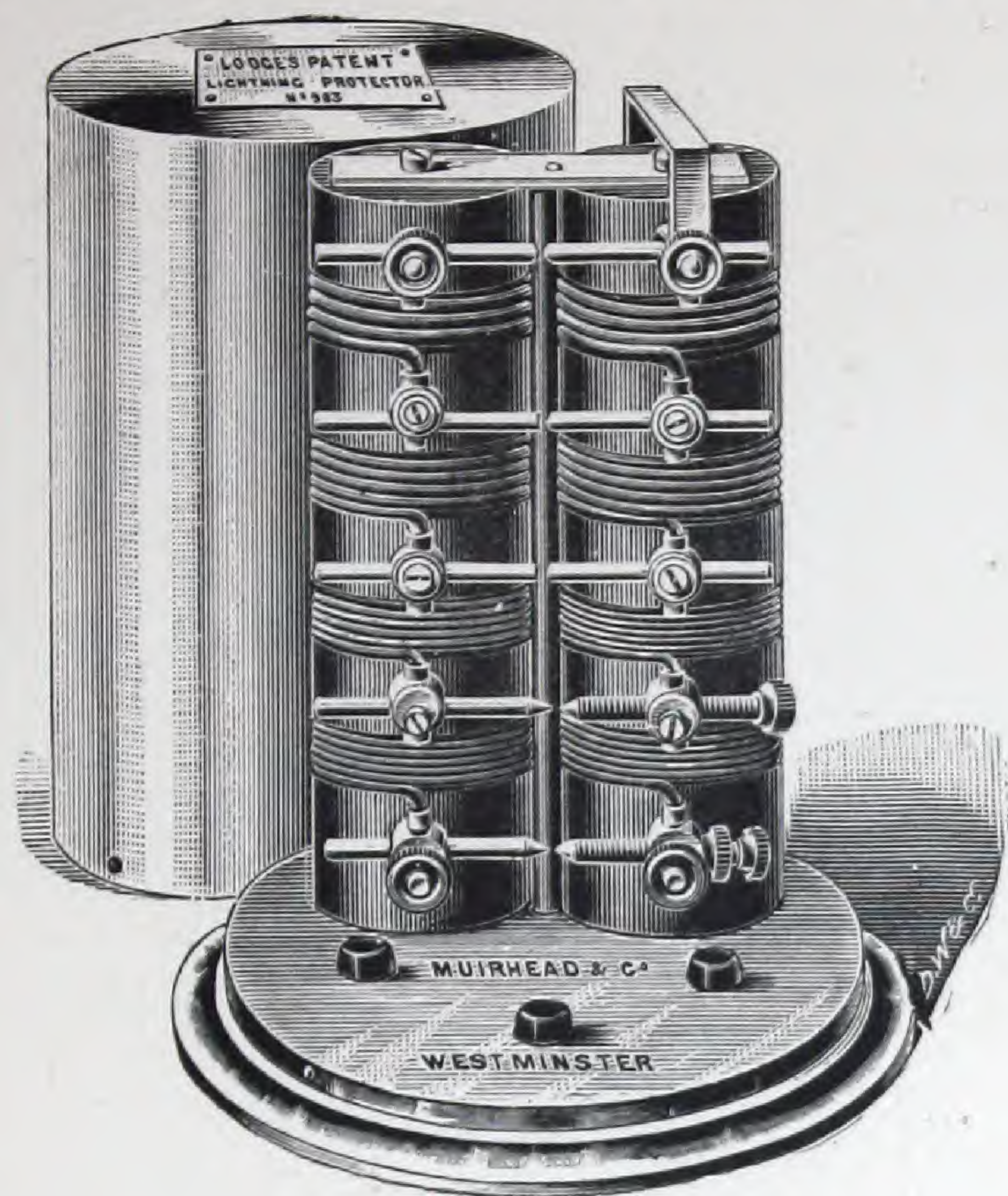
- 319.—**Lightning Guard**, Saunders' old form, but
with metal case 4 10 0
- 320.—Ditto, Saunders' new form, with copper tube,
and cylindrical brass covers, mounted on zinc
base 4 15 0



320.

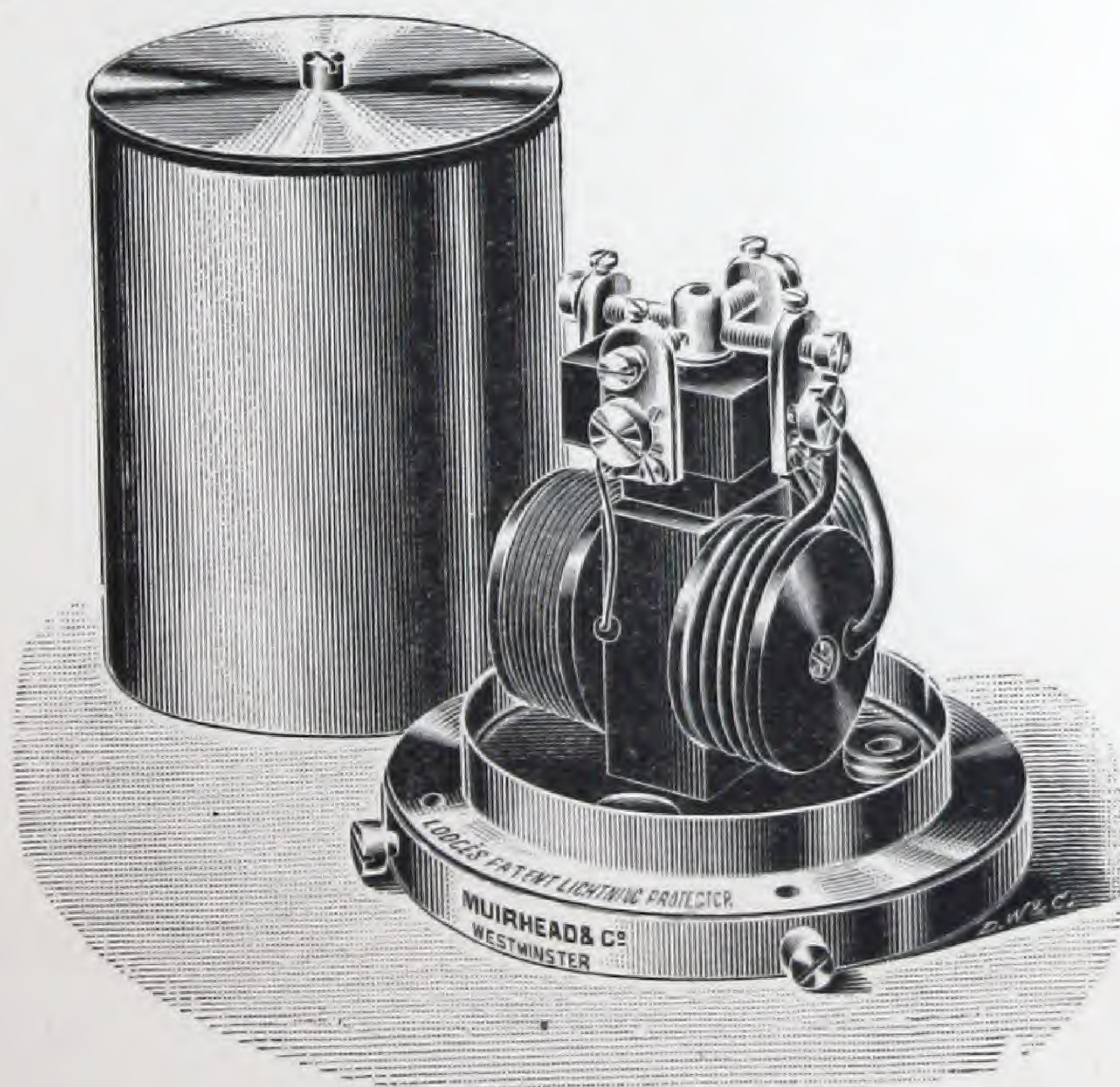
MUIRHEAD & Co, STOREY'S GATE, WESTMINSTER, S.W.

321.—Ditto, Lodge's patent, double upright form ... 10 0 0



321.

322.—Lightning Guard, Lodge's patent, single form 4 4 0

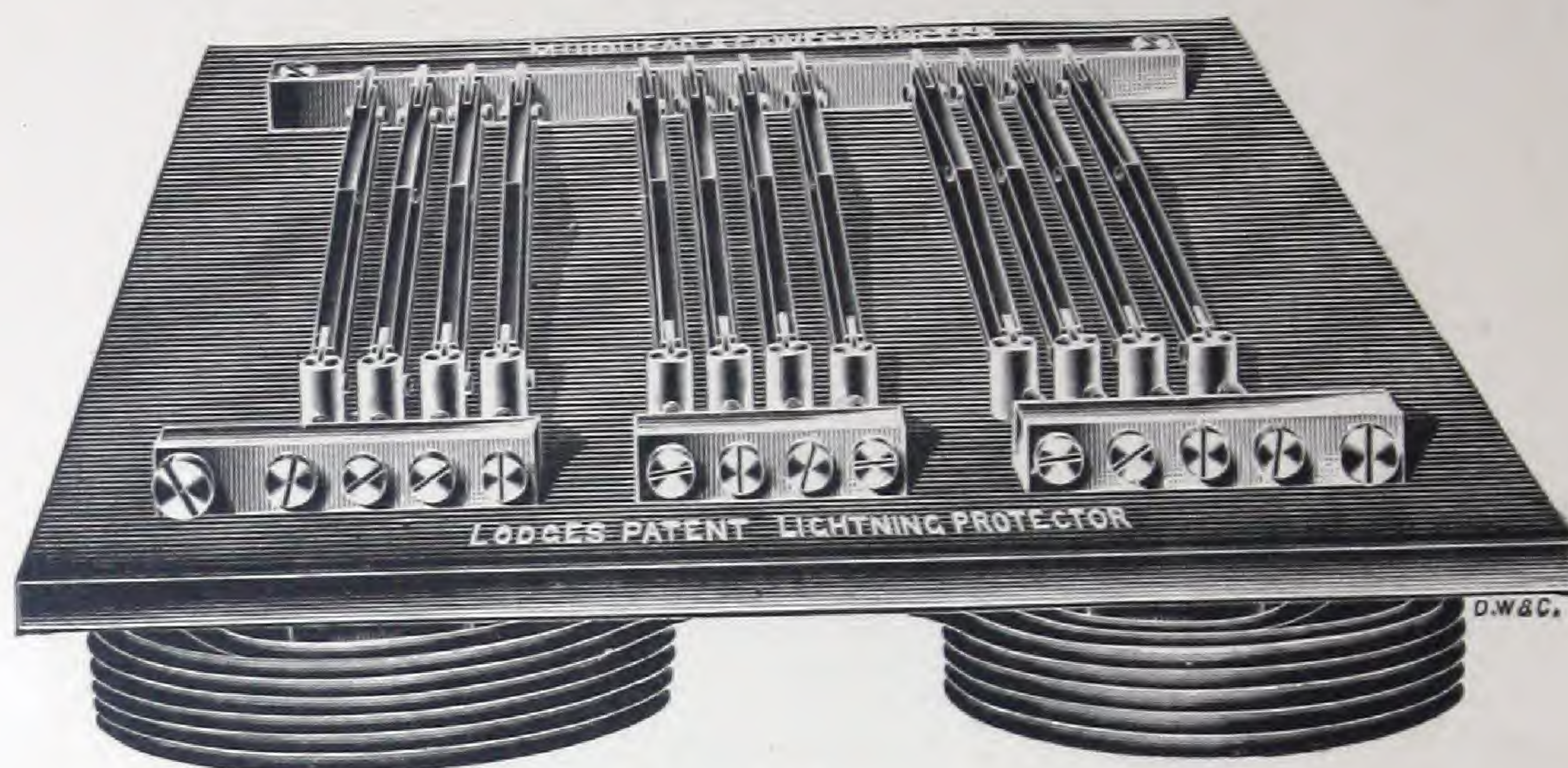


322.

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

323.—**Lightning Guard**, ditto, form for Electric
Light Installations, special pattern for high
voltage alternating currents from £5 5s. to

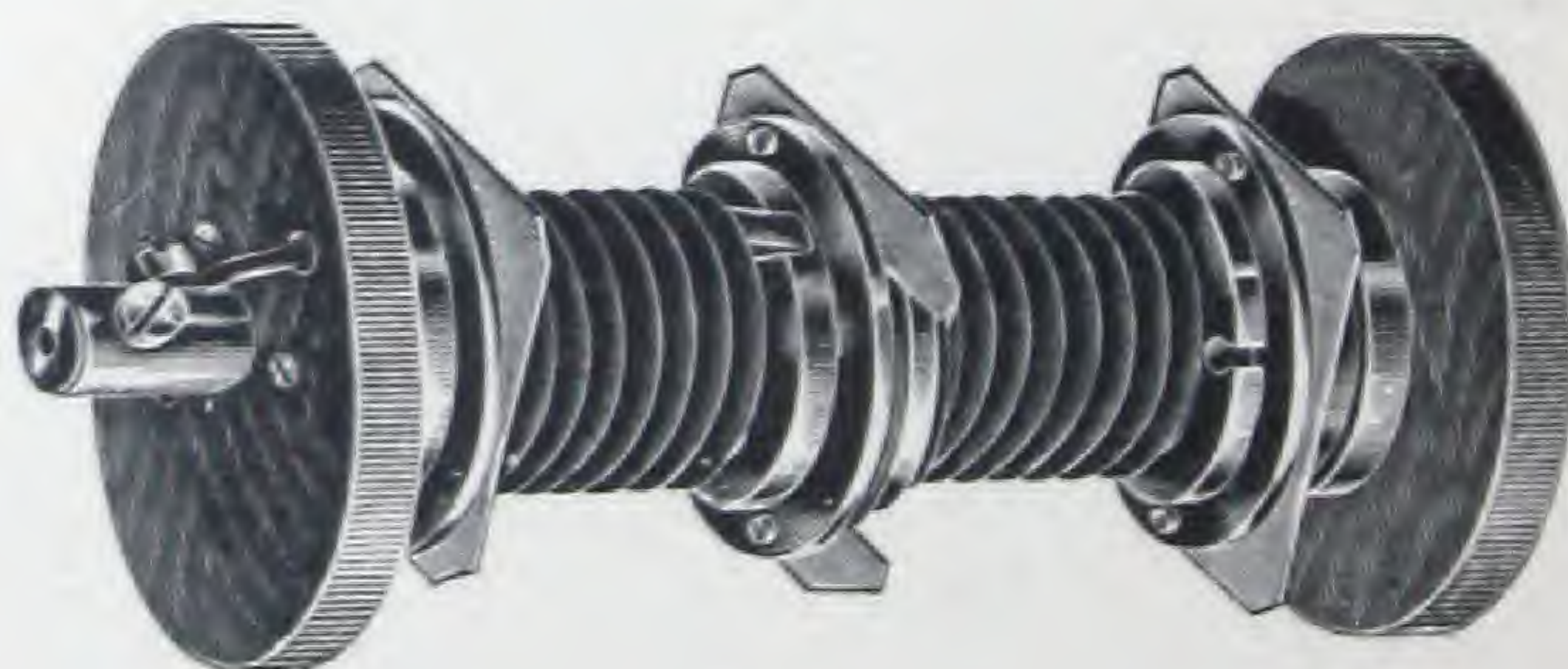
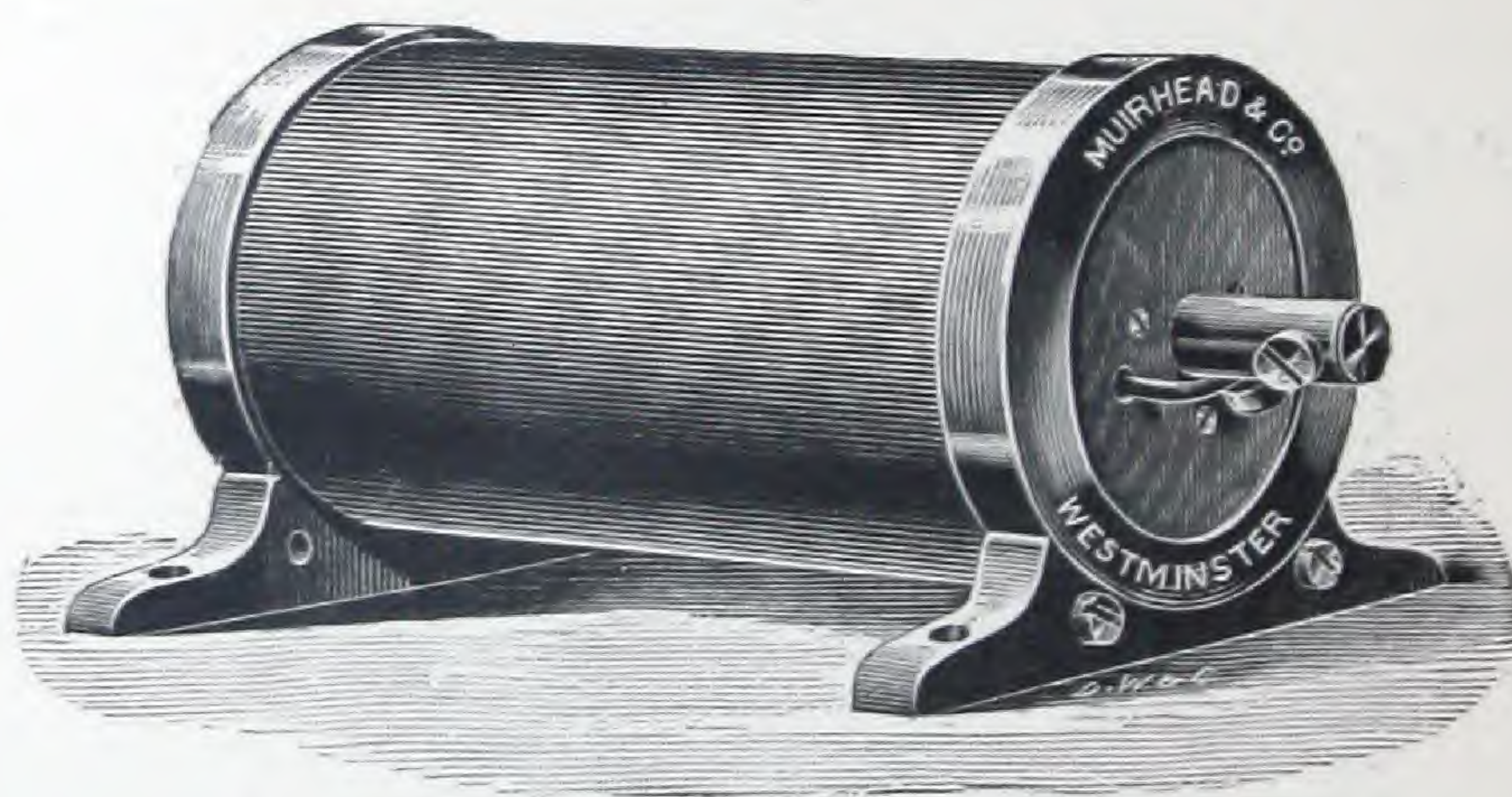
10 0 0



323.

324.—Ditto ... ditto, special pattern for low
pressure electric light installations ... from

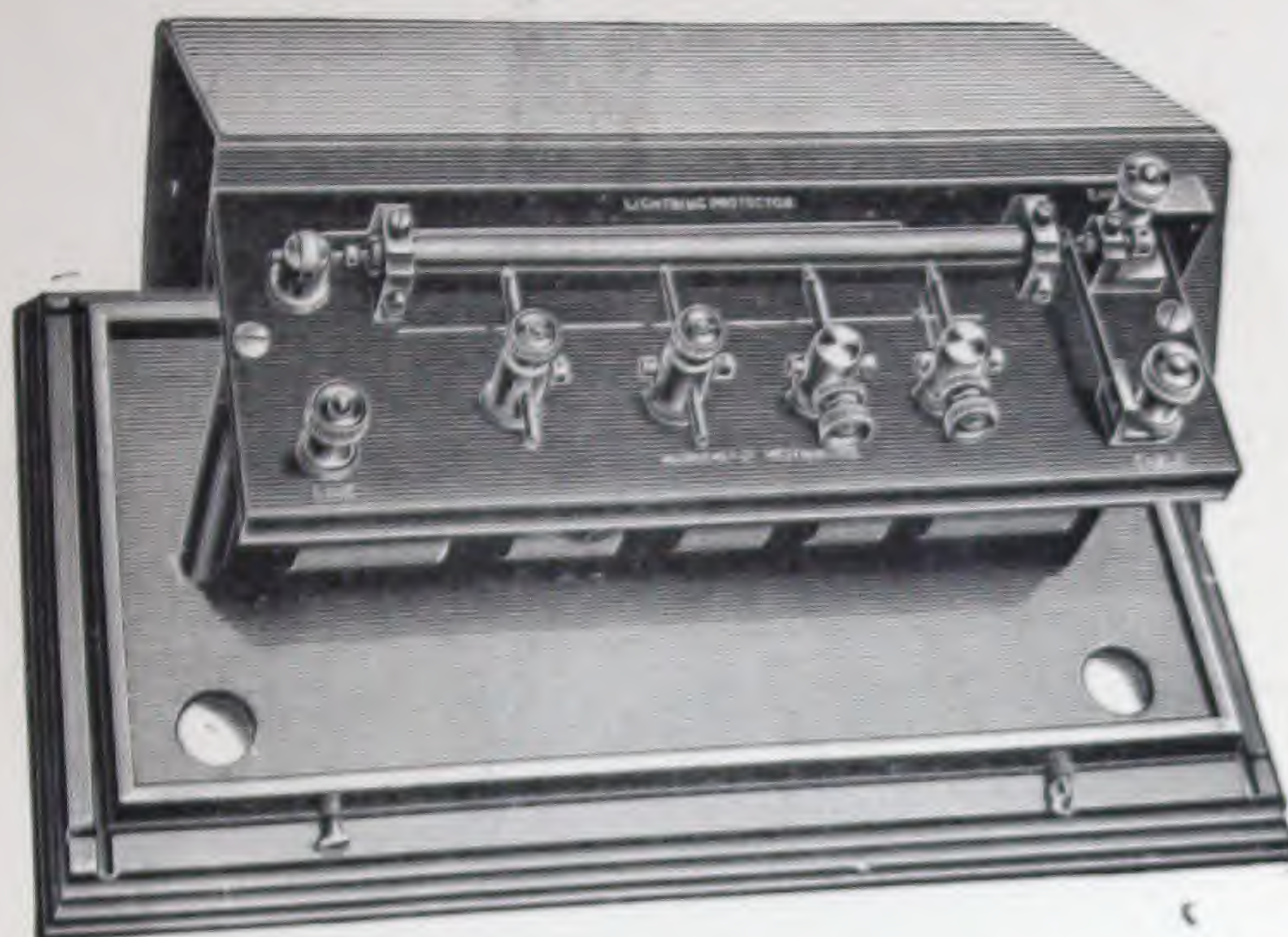
3 0 0



324.

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

- 328.—Ditto, combined Lodge and Saunders', in stout iron case 7 10 0



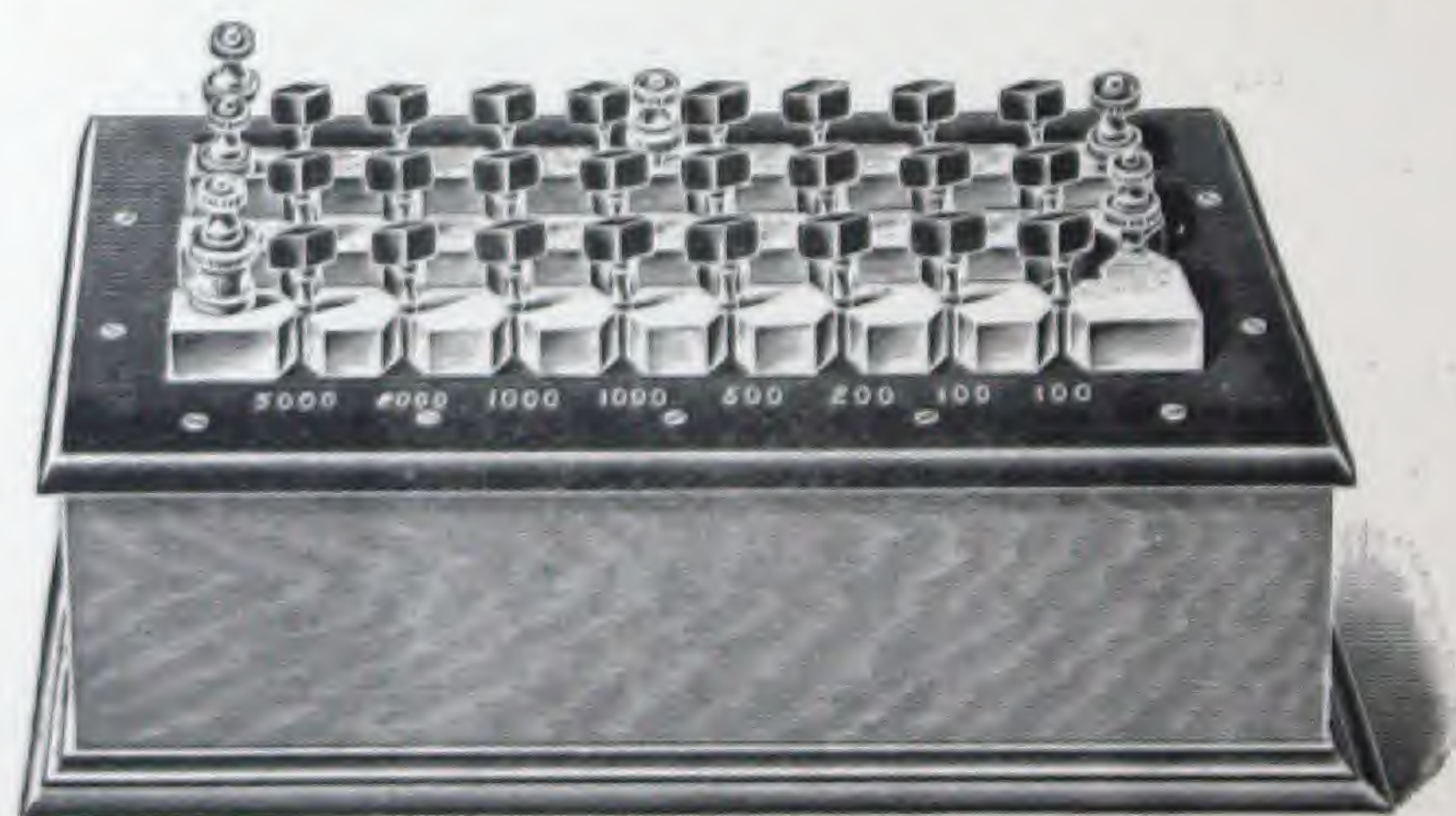
328.

- 330.—Siemens' Plate Lightning Discharger,
for single line 1 1 6
- 331.—Ditto, for double line 1 15 0
- 332.—Smooth Brass Plate Lightning Guard,
with mica plate insulation, on teak base, for
one line 0 15 0
- 333.—Ditto ... ditto, for two lines 1 5 0
- 334.—Bright's Lightning Protector, for submar-
ine cables 3 0 0
- 335.—Varley's Vacuum Tube Lightning Pro-
tector, for submarine cables 2 2 0

SECTION V.

RESISTANCE COILS.

- 415.—Set of Resistance Coils, 16 bobbins, 10,000 ohms in the aggregate, with **Wheatstone Bridge** attached, consisting of three pairs of coils of equal resistance (two tens, two hundreds, and two thousands), in German silver or platinum silver alloy wire or platinoid wire ... 33 0 0
- 416.—Ditto, same construction as No. 415, much more portable, the wire of platinum silver alloy. ... 33 0 0
- 417.—Ditto, large, same construction as No. 415, but with **Wheatstone Bridge** of four pairs of equal coils, in German silver wire ... 38 0 0

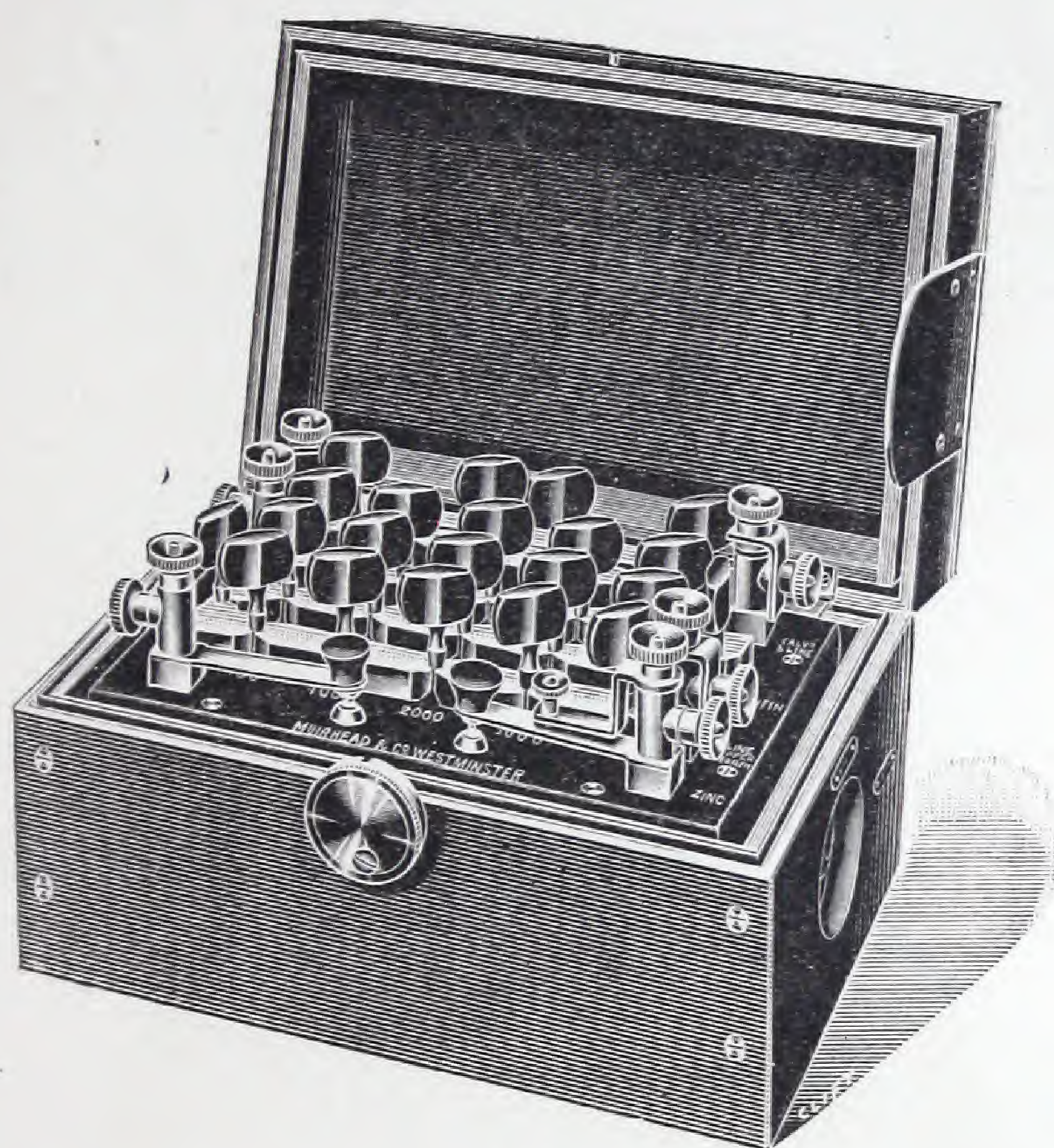


417

All Standard Resistances, unless otherwise ordered, will be adjusted to the B.A. ohm.

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

- | | |
|---|--------|
| 418.—Set of Resistance Coils, small portable set,
containing 10,000 ohms in the aggregate,
without bridge, in small travelling case ... | 17 0 0 |
| 419.—Set of Resistance Coils, 1 to 1,000 ohms ... | 12 0 0 |
| 420.—Ditto P.O. pattern, with bridge, battery key and
galvanometer key, the wire of platinum silver
alloy | 24 0 0 |
| 421.—Ditto, same as No. 420, but fitted with battery
reverser | 26 0 0 |



421.

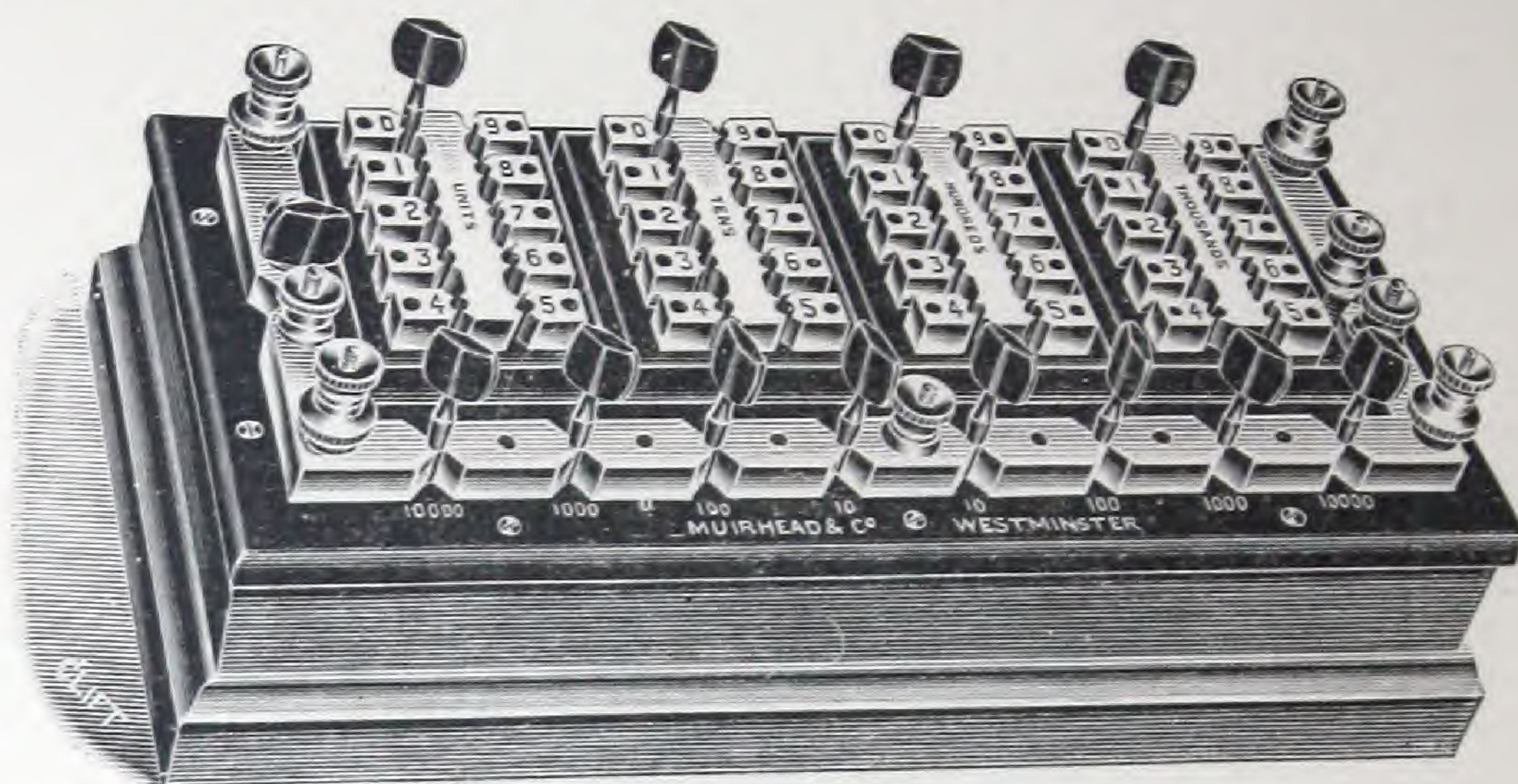
- | | |
|---|--------|
| 422.—Set of Resistance Coils, large, dial pattern,
arranged in units, tens, hundreds, and
thousands, with bridge attached consisting of
two tens, two hundreds, two thousands, and
two ten thousands, in German silver wire ... | 46 0 0 |
|---|--------|

All Standard Resistances, unless otherwise ordered, will be adjusted to the B.A. ohm.

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

422A. Set of Resistance Coils, medium, 10,000 ohms, Muirhead's rectangular pattern, arranged in units, tens, hundreds and thousands, with bridge of four pairs of proportional coils (10, 100, 1,000, 10,000)

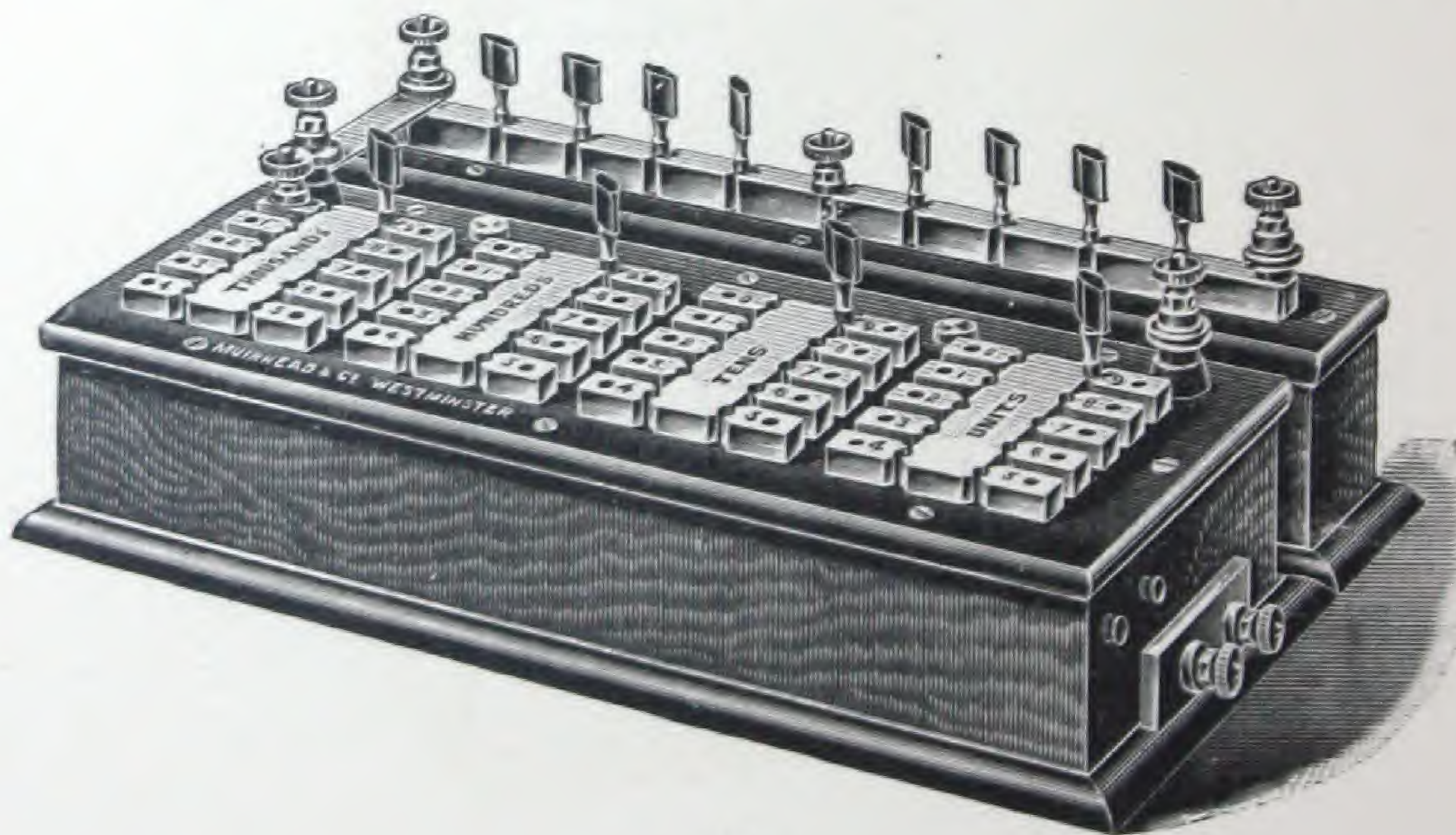
41 0 0



422A.

423.—Ditto ... ditto, large, 10,000 ohms, Muirhead's rectangular pattern, arranged in units, tens, hundreds and thousands, with bridge of four pairs of proportional coils (10, 100, 1,000, 10,000), in separate case, and with thermo-coil of 100 ohms as designed by Messrs. Hockin & Taylor, platinum silver wire

48 0 0



423.

All Standard Resistances, unless otherwise ordered, will be adjusted to the B.A. ohm.

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

423A. Ditto ... of similar construction, but with an extra set of tenths	53 10 0
424.— Set of Resistance Coils , rectangular pattern, for battery testing, arranged in tenths, units, tens, and hundreds	25 0 0
425.— Resistance Box , 100,000 ohms, in four coils, platinum silver alloy wire	12 0 0
426.—Ditto, ditto, in two coils	10 0 0
427.—Ditto, 250,000 ohms, in five subdivisions ...	30 0 0
428.—Ditto, 1 megohm, in five sub-divisions, platinum silver alloy wire	75 0 0
429.—Ditto, ditto in platinoid wire	45 0 0
432.— Portable Testing Set , for Electric Light and other installations, Sliding Resistances 1 to 100 ohms, 3 pairs proportional coils (10, 100, and 1000) Galvanometer and shunt complete, with keys and constant coil, polished teak case	15 0 0

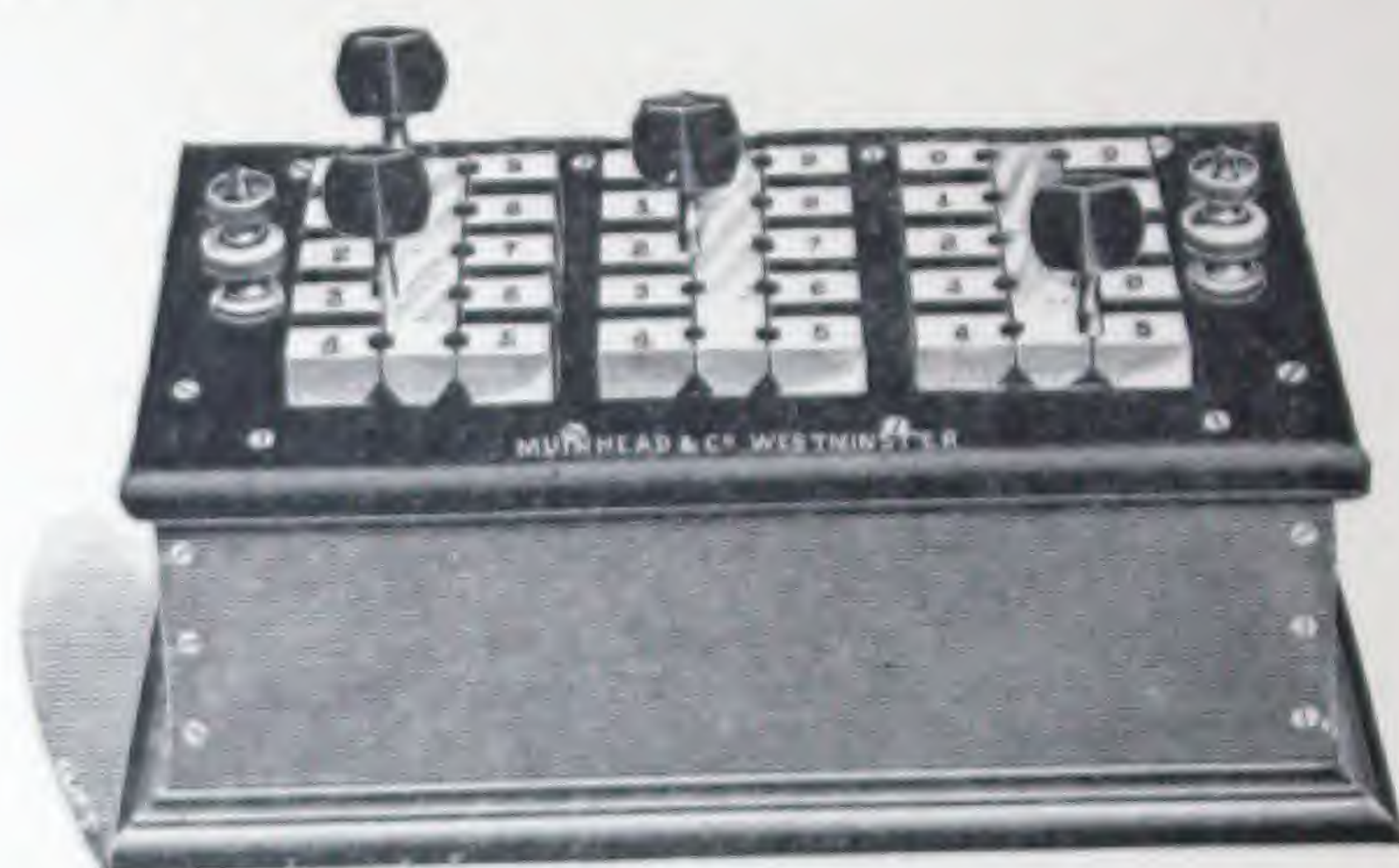


432.

All Standard Resistances, unless otherwise ordered, will be adjusted to the B.A. ohm.

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

433. Cheap Set of Resistance Coils, small, with Wheatstone's Bridge, of three pairs of equal resistance, in platinoid wire, coils 2110 ohms in the aggregate... 13 13 0
- 435.—Resistance Box of one ohm, subdivided into .1, .2, .2, .5 ... 4 0 0
- 438.—Ditto, 100 ohms complete, with bridge, galvanometer key, and wire bridge, Government pattern ...
- 439.—Ditto, arranged in tenths, units and tens; specially designed for use in Muirhead's duplex system ... 15 0 0



439.

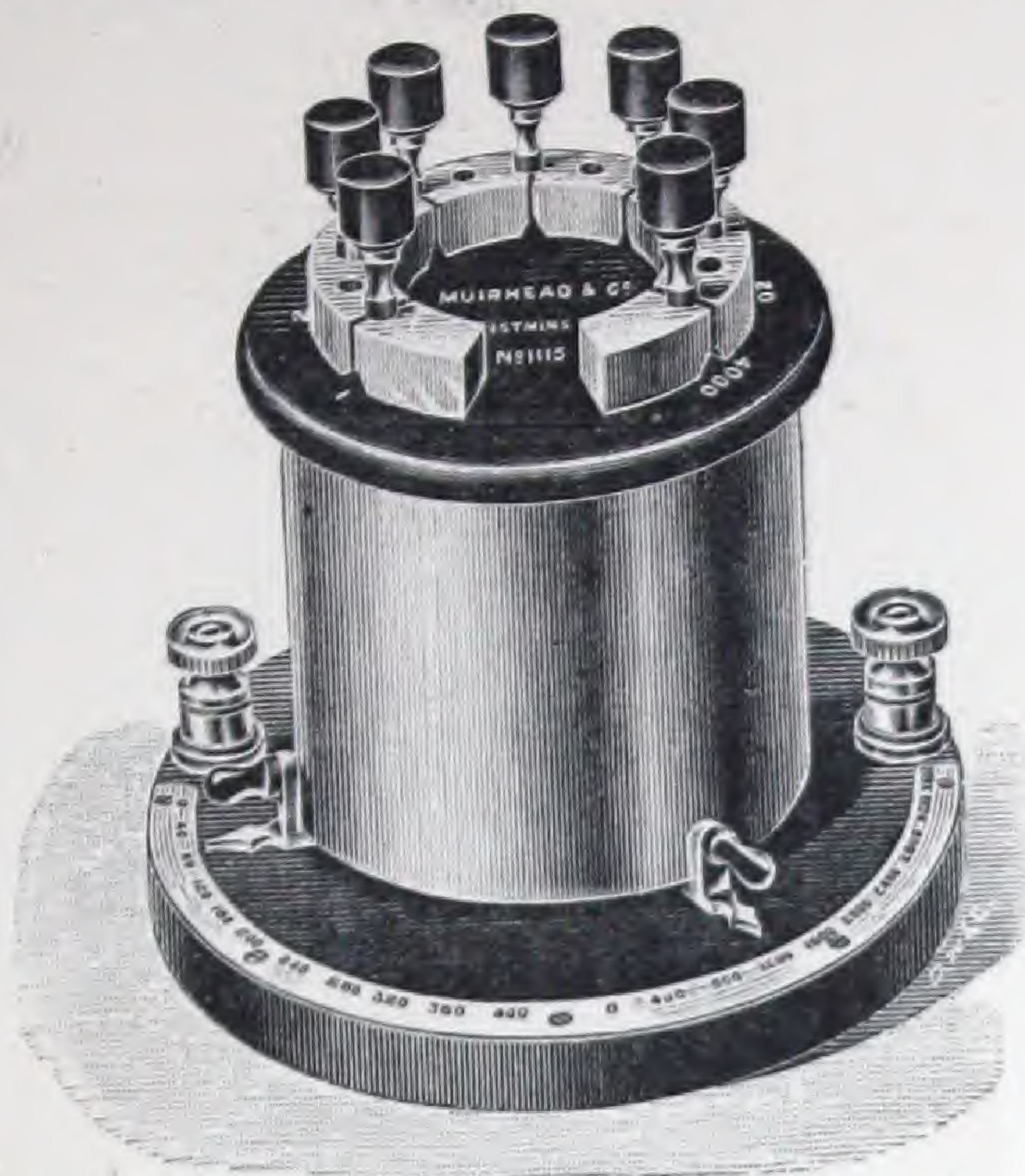
- 441.—Single Resistance Coils, accurately adjusted from 1 to 1,000 ohms ... from 15s. to 1 1 0
- 445.—Standard Resistance Coil, copy of B.A. unit or legal ohm, or the Board of Trade True ohm, as issued by the Committee of the British Association on Electrical Standards.. 3 10 0
- 446.—Ditto ... with thermo-electric couple... 4 10 0
- Cambridge Certificates of value for Nos. 445 and 446 ... from £1 1 0*

All Standard Resistances, unless otherwise ordered, will be adjusted to the B.A. ohm.

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

- 450.—Circular Rheostat, Muirhead's pattern, from
1 to 8,000 ohms

10 10 0



450

- 451.—Ditto ... ditto, from 1 to 10, 000, arranged so
that the small coils may be used separately

11 10 0

- 451A. Circular Rheostat, P.O. pattern, for duplex
working

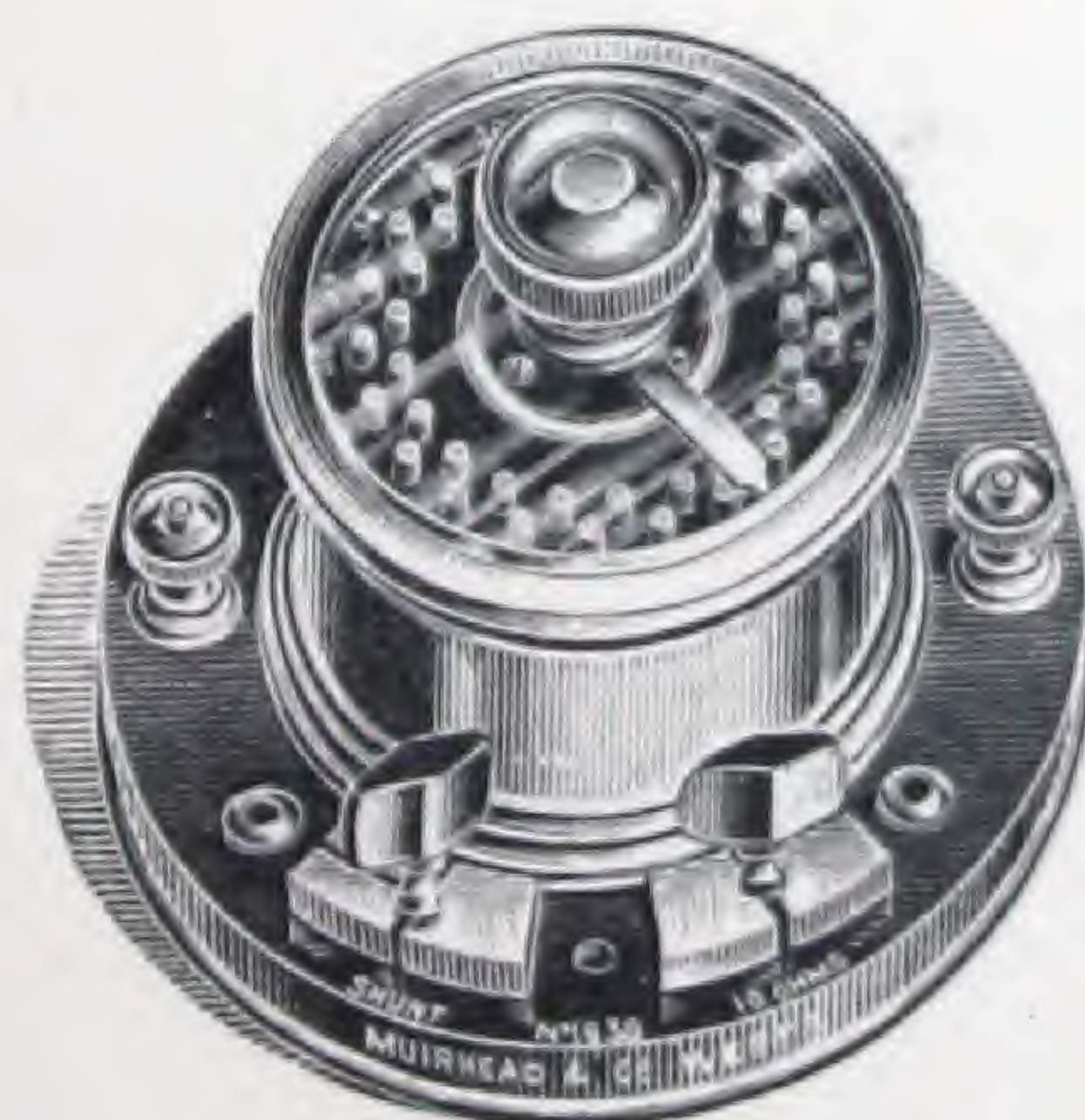
7 10 0

- 452.—Ditto, ditto, with four extra coils of 1, 2, 2,
5 ohms

10 10 0

- 453.—Circular Rheostat, of quarter units, with
shunt commutator, for duplex balancing on
submarine cables

15 0 0

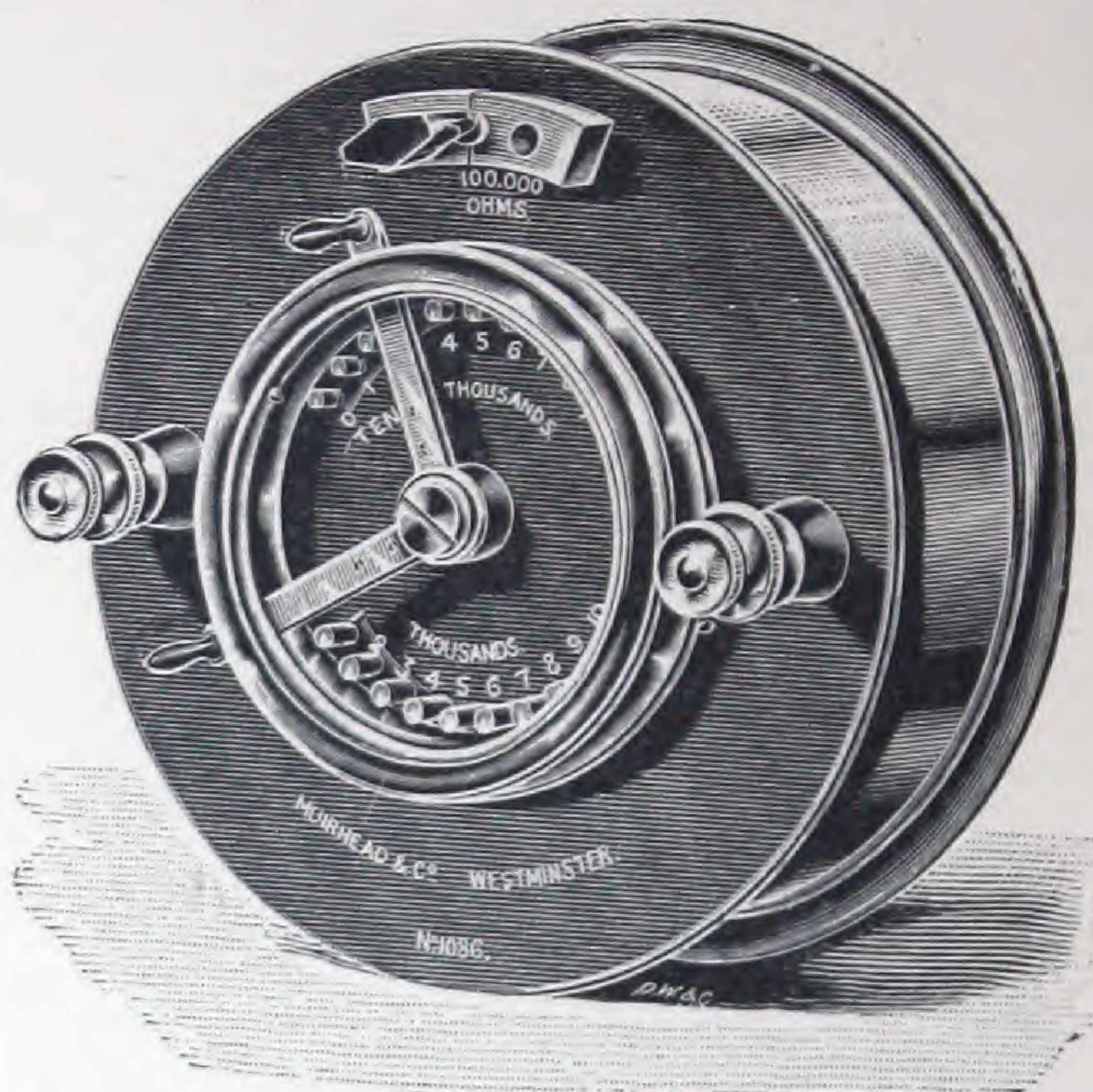


453.

All Standard Resistances, unless otherwise ordered, will be adjusted
to the B.A. ohm.

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

- 455.—Circular Rheostat, large, of high resistance,
Muirhead's slide pattern, for duplex balancing
on submarine cables, total resistance 210,000
ohms 30 0 0



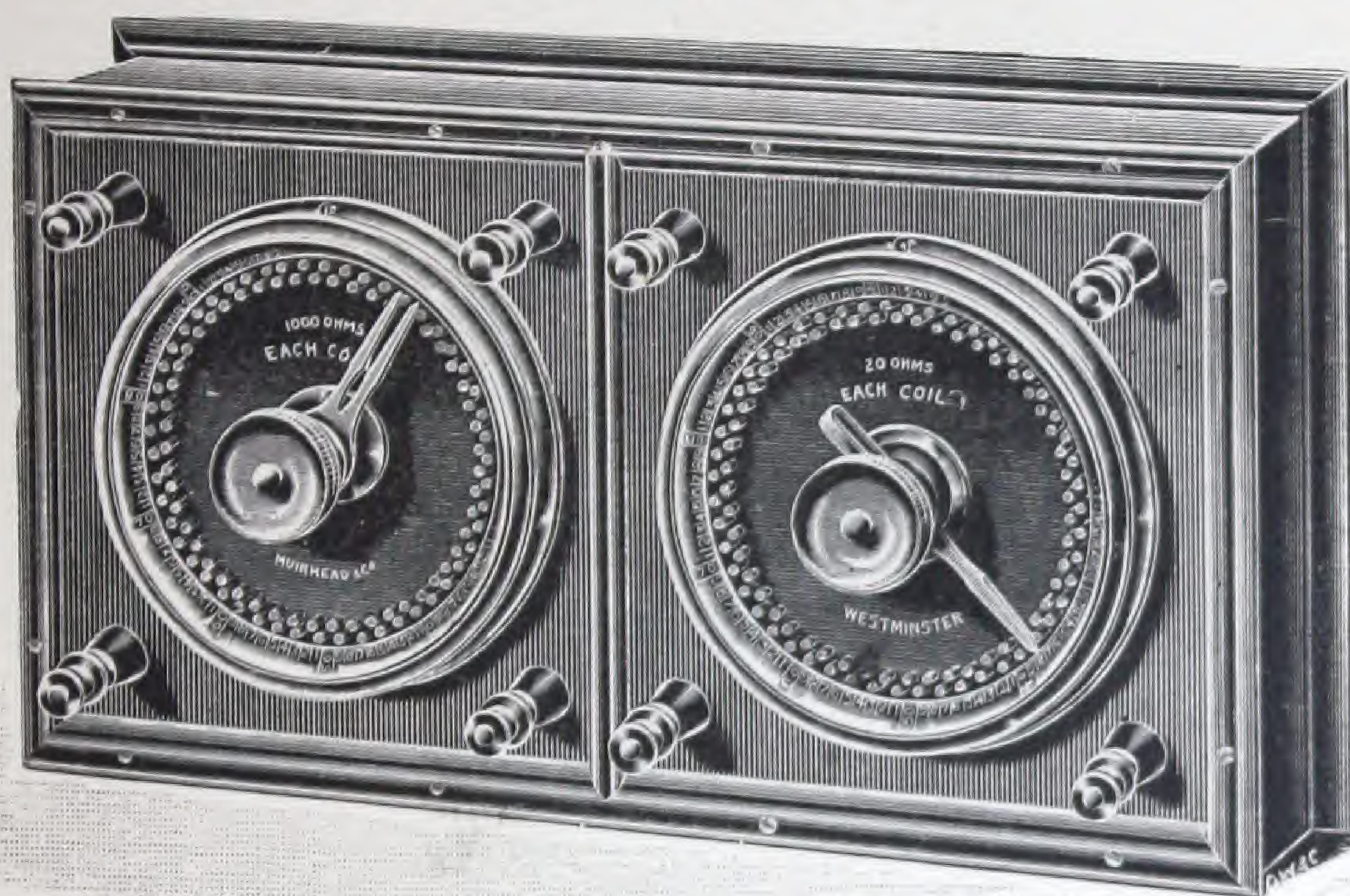
455

- 456.—Ditto, ditto, rectangular pattern, two separate
dials 32 15 0
- 460.—Rheostat, Wheatstone's 3 10 0
- 461.—Ditto, Thomson's continuous, 600 ohms, platinoid
wire 5 0 0
- 462.—Ditto, ditto, to carry 20 ampères, low resistance 10 0 0
- 463.—Rheocord, Du Bois-Reymond's 11 0 0
- 464.—Round Compensator, Du Bois-Reymond's 12 10 0
- 465.—Rheometer, Kohlrausch's
- 466.—Wheatstone Bridge, Kohlrausch's, with
induction apparatus resistances of 1, 10, 100,
and 1000 ohms, and bridge wire, complete ... 7 10 0
- 467.—Meter Bridge, Wheatstone's, improved form,
with divided metre wire of German silver or
platinum iridium alloy ... from £3 15s. to 15 15 0

All Standard Resistances, unless otherwise ordered, will be adjusted
to the B.A. ohm.

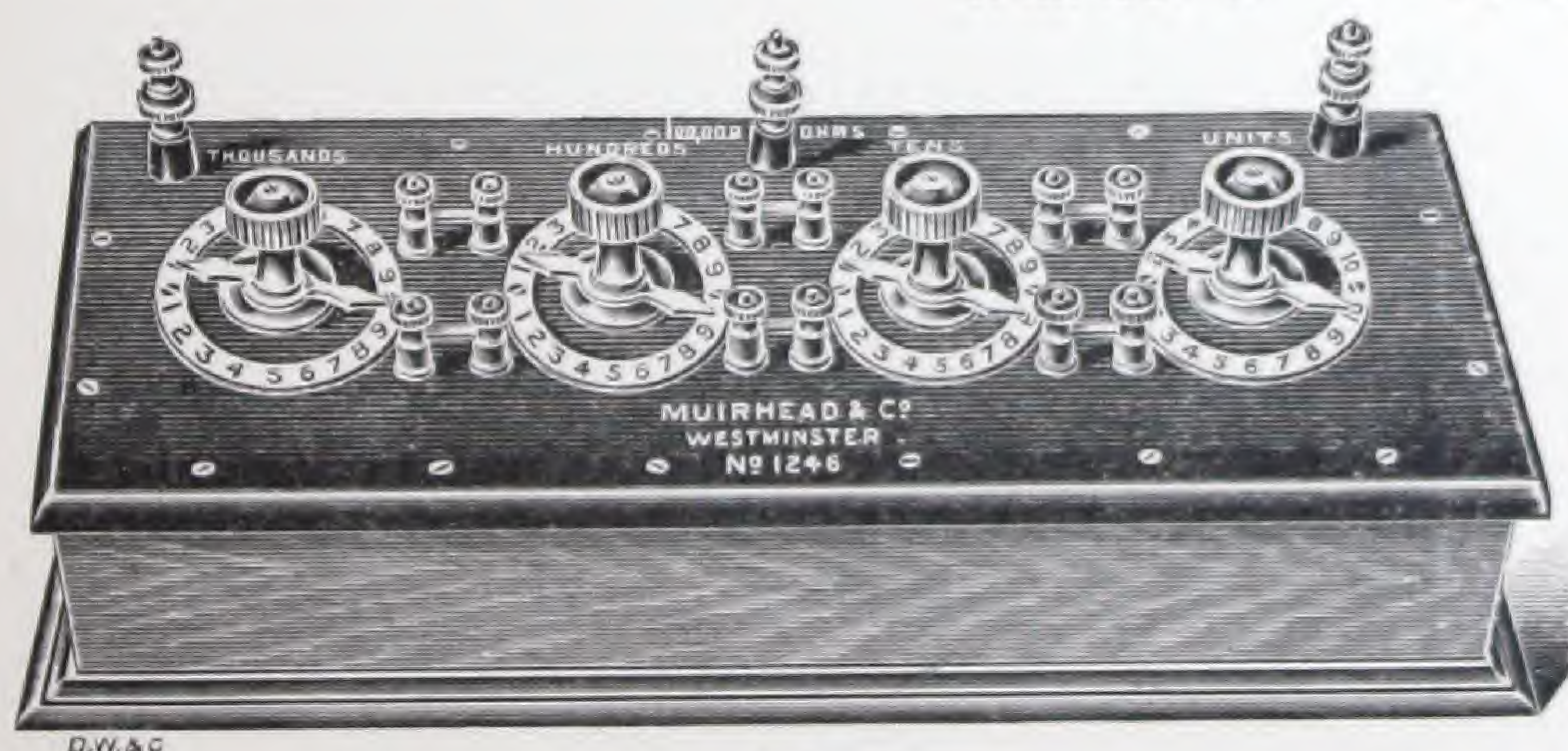
MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

468.—Ditto, Poggendorff's	...	...	...	...	7 10 0
469.—Ditto, B.A. pattern, with proportional coils. complete, for measuring and comparing resistances	...	...	...	... from	9 9 0
470.—Wheatstone Bridge, similar to No. 466, with wire wound on marble cylinder	...				11 10 0
475.—Set of Slide Resistance Coils, Thomson and Varley's, Muirhead's pattern			65 0 0



475.

476.—Ditto, Muirhead's Patent, with four dials from £28 to	31 10 0
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476.

All Standard Resistances, unless otherwise ordered, will be adjusted to the B.A. ohm.

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

480.—Potentiometers, various

481.—Graphite Rheostat, adjustable to 100,000
ohms 1 5 0



481.

482.—One Megohm, in Graphite, in ten sections,
similar to the above 9 0 0

483.—Varley's Carbon Rheostat 1 5 0

Mercury Cups (Matthiessen's), in ebonite or
boxwood each 0 1 2

Bobbins for experimental work.

Platinum Silver, Platinum Iridium, German Silver, Platinoid,
Copper, Phosphor Bronze, bare or covered with silk or
cotton, in wire or sheet to order.

Ozokerit and Paraffin Wax of high melting point.

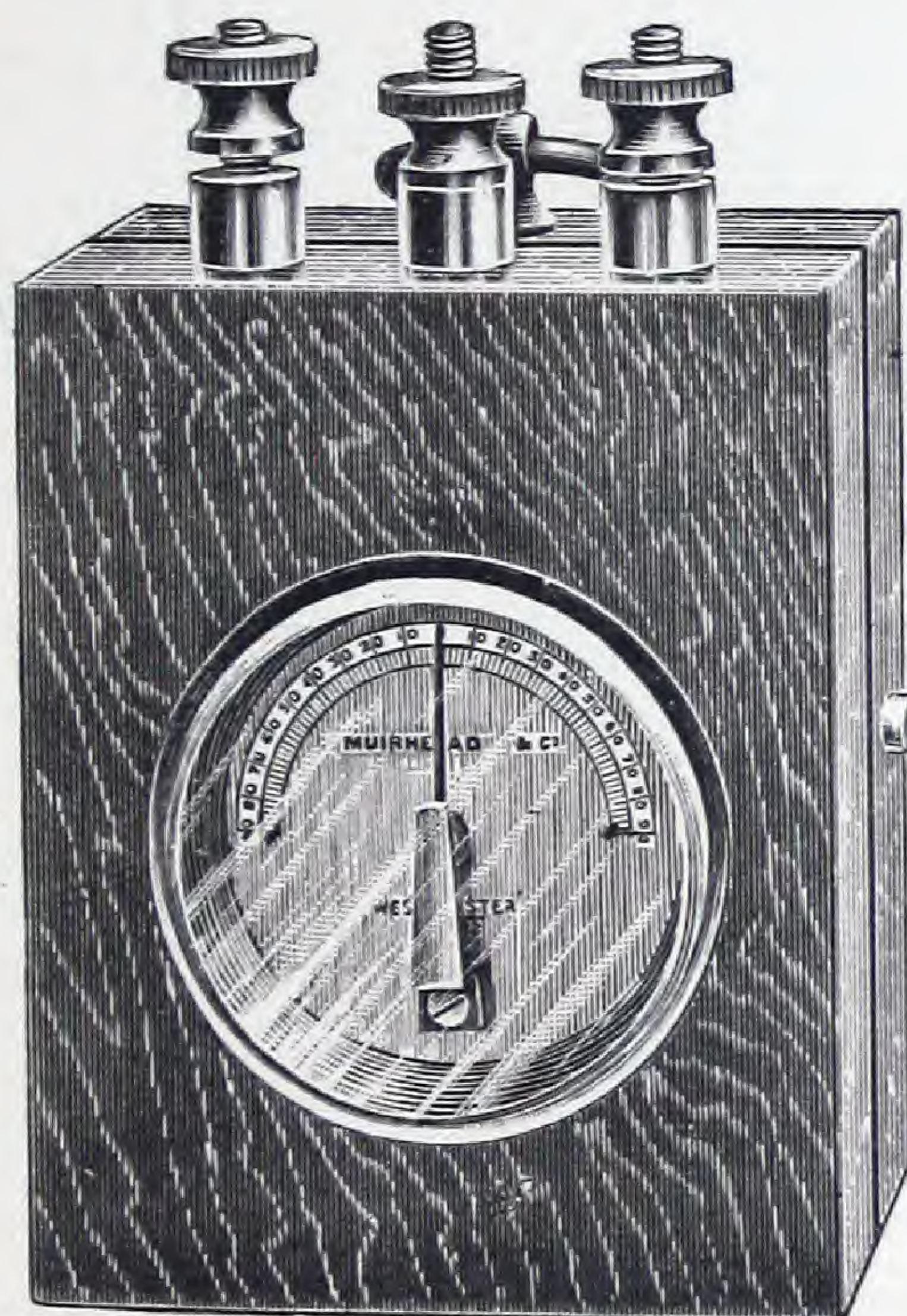
All Standard Resistances, unless otherwise ordered, will be adjusted
to the B.A. ohm.

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

SECTION VI.

GALVANOMETERS.

- | | |
|--|-------|
| 535.—Galvanometer; or Lineman's Detector,
with vertical needle and one circuit only ... | 2 0 0 |
| 536.—Ditto, ... ditto, with two circuits, high and
low resistance | 3 0 0 |



536.

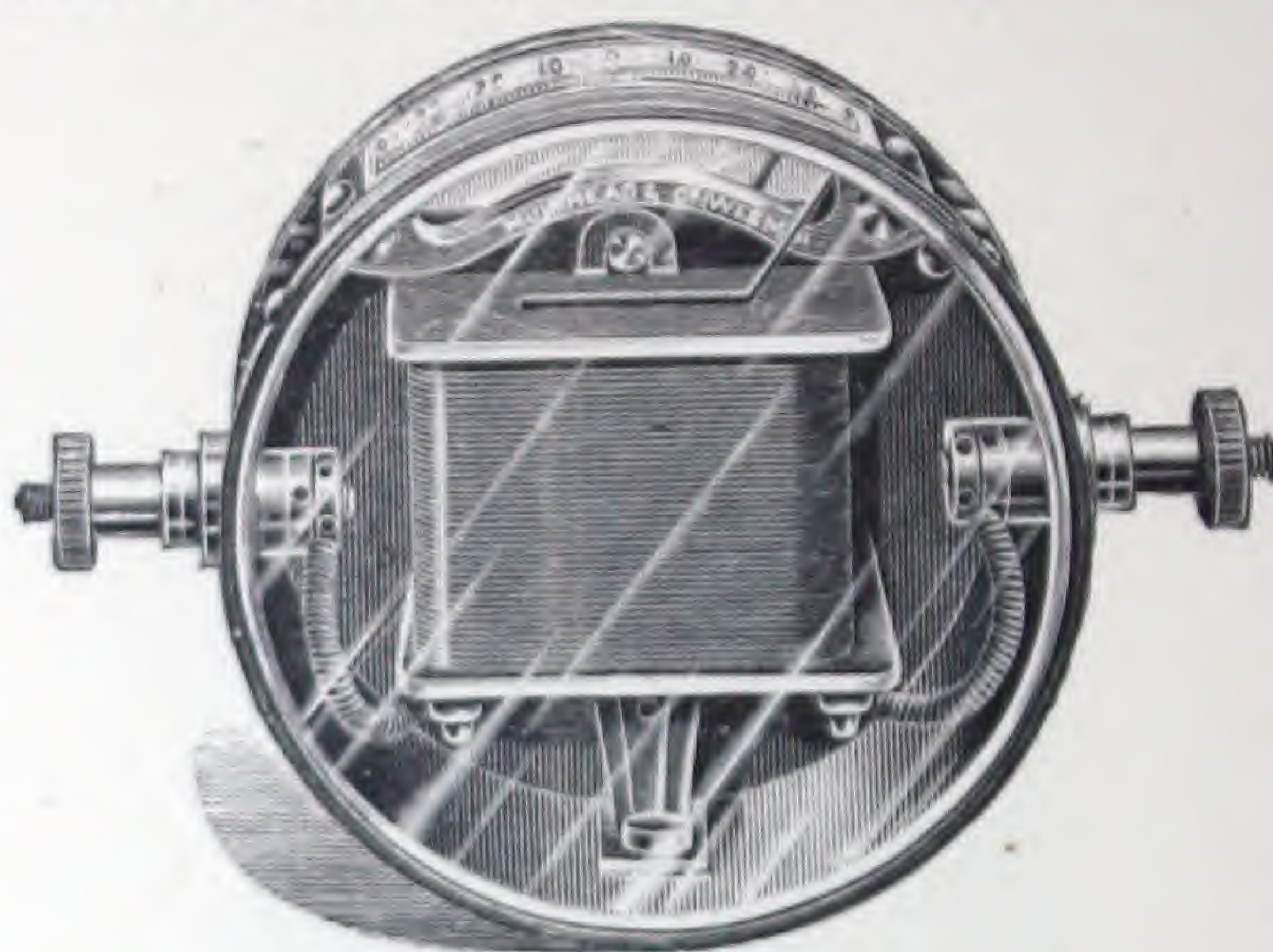
- | | |
|---|-------|
| 537.—Galvanometer ... ditto, with three circuits
of 2 ohms, 10 ohms, and 1,000 ohms respec-
tively | 5 0 0 |
| 538.—Ditto, test box detector, with vertical needle
fitted with commutator for line testing, P.O.
pattern | 6 0 0 |
| 539.—Ditto, portable form, consisting of an astatic
galvanometer in brass case with jewelled
centres, 1,000 ohms resistance, in leather case
with sling strap, complete | 5 0 0 |

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.



539.

- 540.—Galvanometer, P.O. pattern, in leather case ... 4 10 0



540.

- 541.—Galvanometer, with suspended astatic needle, mounted on polished teak base, with spirit level and adjusting screws, complete in travelling case ... 8 8 0
- 542.—Spring Galvanometer, Kohlrausch's, Ammeter ...
- 543.—Ditto ... ditto, Voltmeter ...
- 544.—Edelmann's Aperiodic Galvanometers with bell shaped magnets, surrounded by a cylinder of copper ... from £3 to 8 8 0
- 545 —Wiedemann's Galvanometer, designed so that the distance of the coils from the needle may be varied. The magnet suspended in a chamber in the centre of a copper cylinder ..
- 548 —Tangent Galvanometer, complete, with short circuiting key, shunt and resistance coil for line testing by received current method, P.O. pattern ... 12 10 0

- 549.—Ditto, Schwendler's, as used by the Indian Government 14 0 0
- 550.—Ditto ... Kohlrausch's
- 550A. Ditto ... Gaugain's 8 10 0
- 551.—Sine and Tangent Galvanometer, Prof. G. F. Fitzgerald's
- 555.—Reflecting Astatic Galvanometer, Thomson's, with two coils of short thick wire, on tripod stand, complete with lamp and scale. In this instrument the coils are hinged, and the needle suspension can easily be raised or lowered from outside the brass case 11 11 0

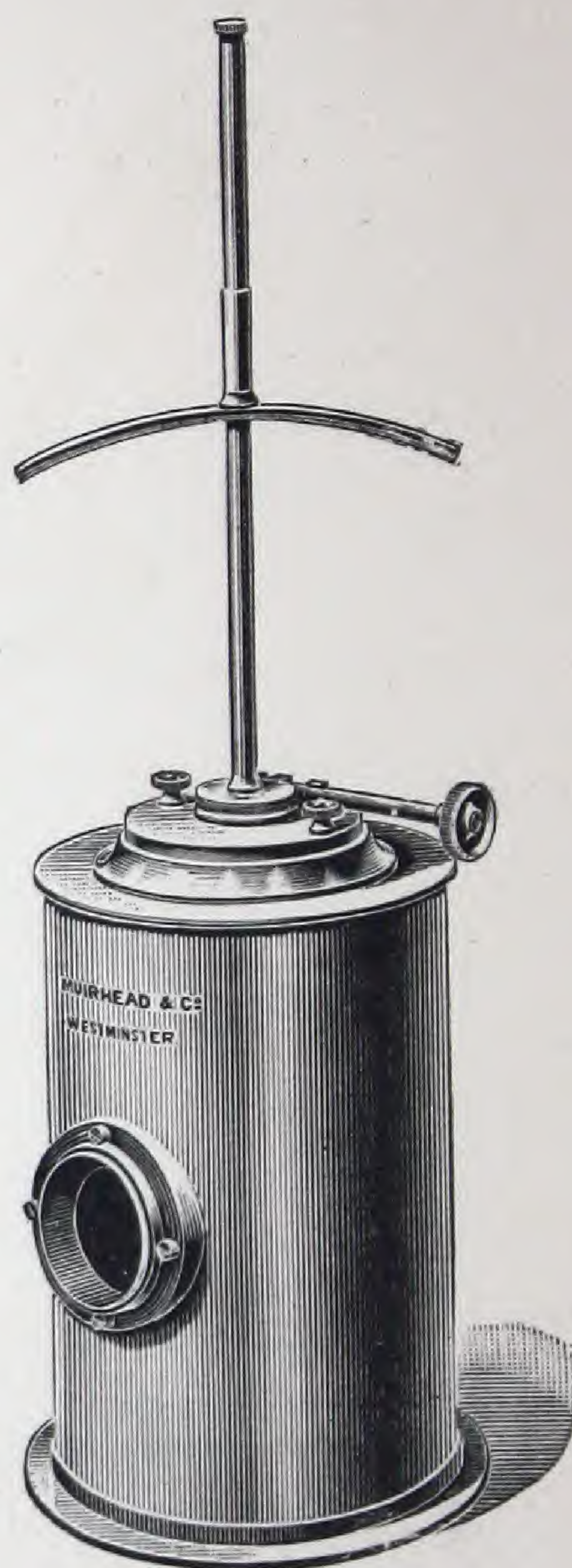
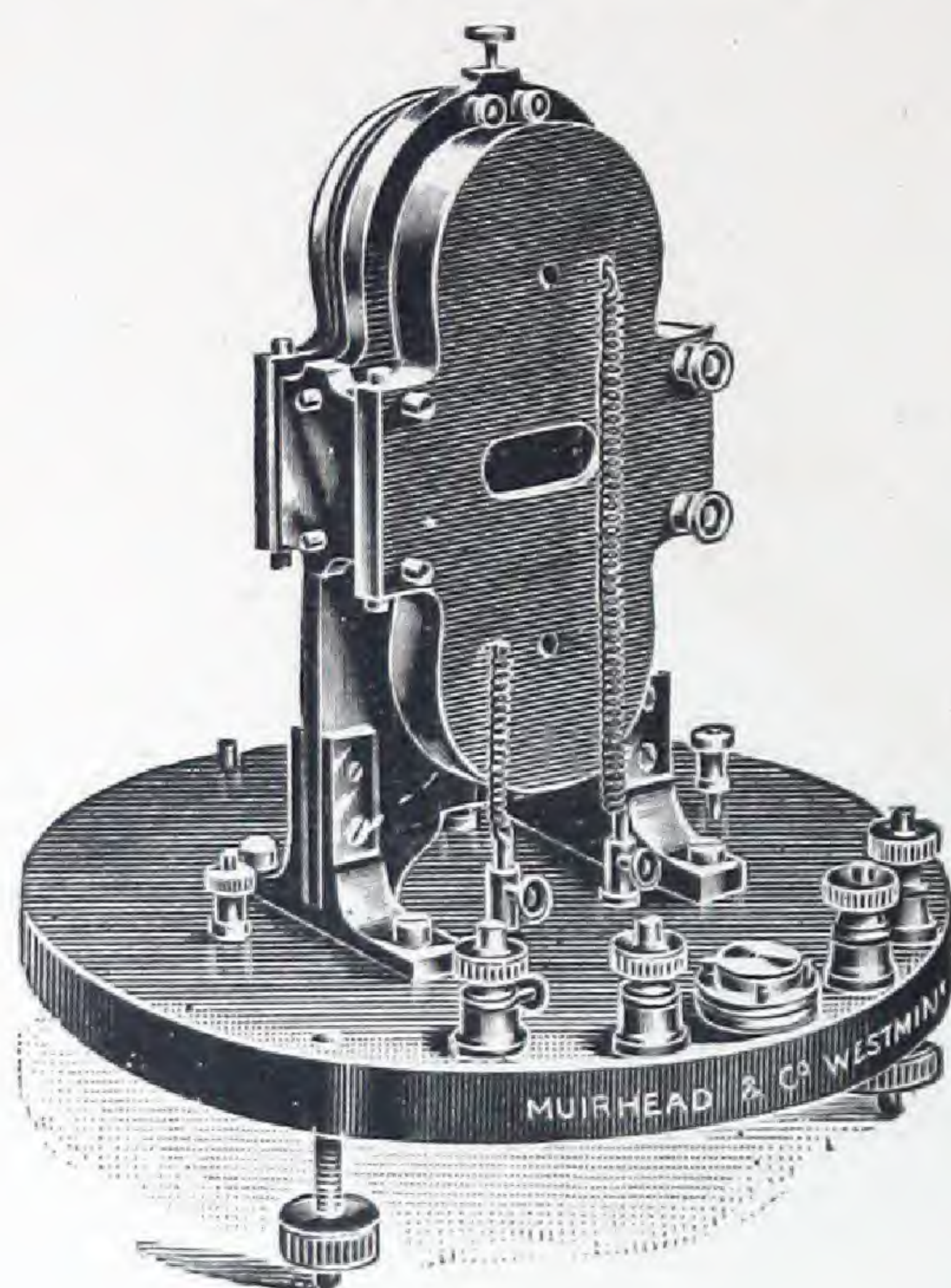


555.

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

556.—Reflecting Astatic Galvanometer, same as No. 555, but with from 2,000 to 3,000 ohms resistance, with set of shunts, lamp, scale and stand complete ... 14 10 0

558.—Ditto, Muirhead's pattern, with four coils on hinges, in either round or square brass or glass case, resistance of coils about 6,000 ohms, complete, with lamp and scale ... 19 19 0



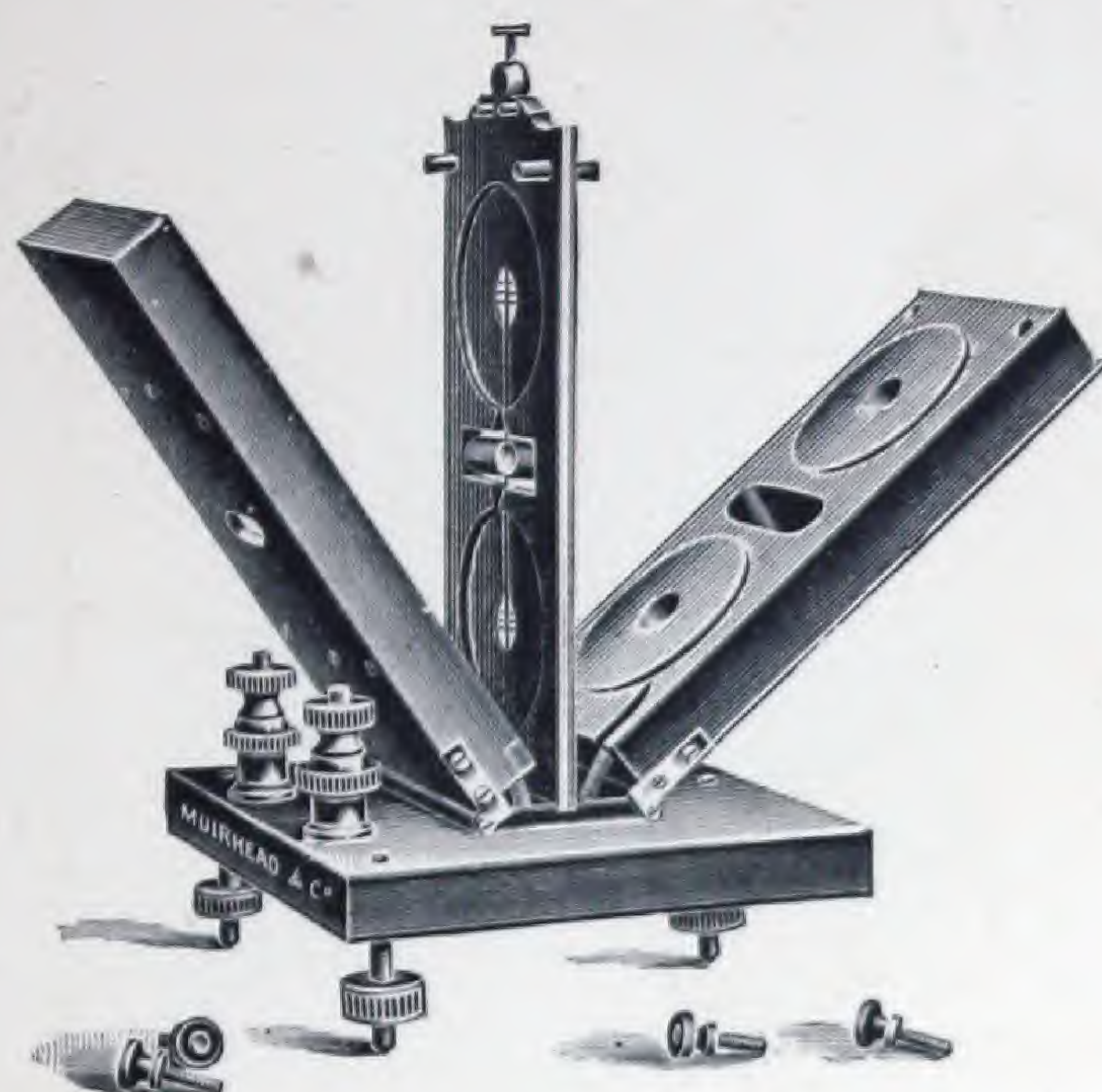
558.

559.—*differentially* Reflecting Astatic Galvanometer, ditto, with coils ~~differently~~ wound, complete with lamp and scale ... 22 10 0

562.—Ditto, ditto, in German silver or platinum silver alloy wire ...

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

- 563.—**Reflecting Astatic Galvanometer**, cheap and portable form, four coils fixed to two thick ebonite slabs hinged at the base of the instrument, by simply removing two screws with milled heads, these ebonite slabs can be turned back, and the suspension adjusted or removed ... 10 0 0

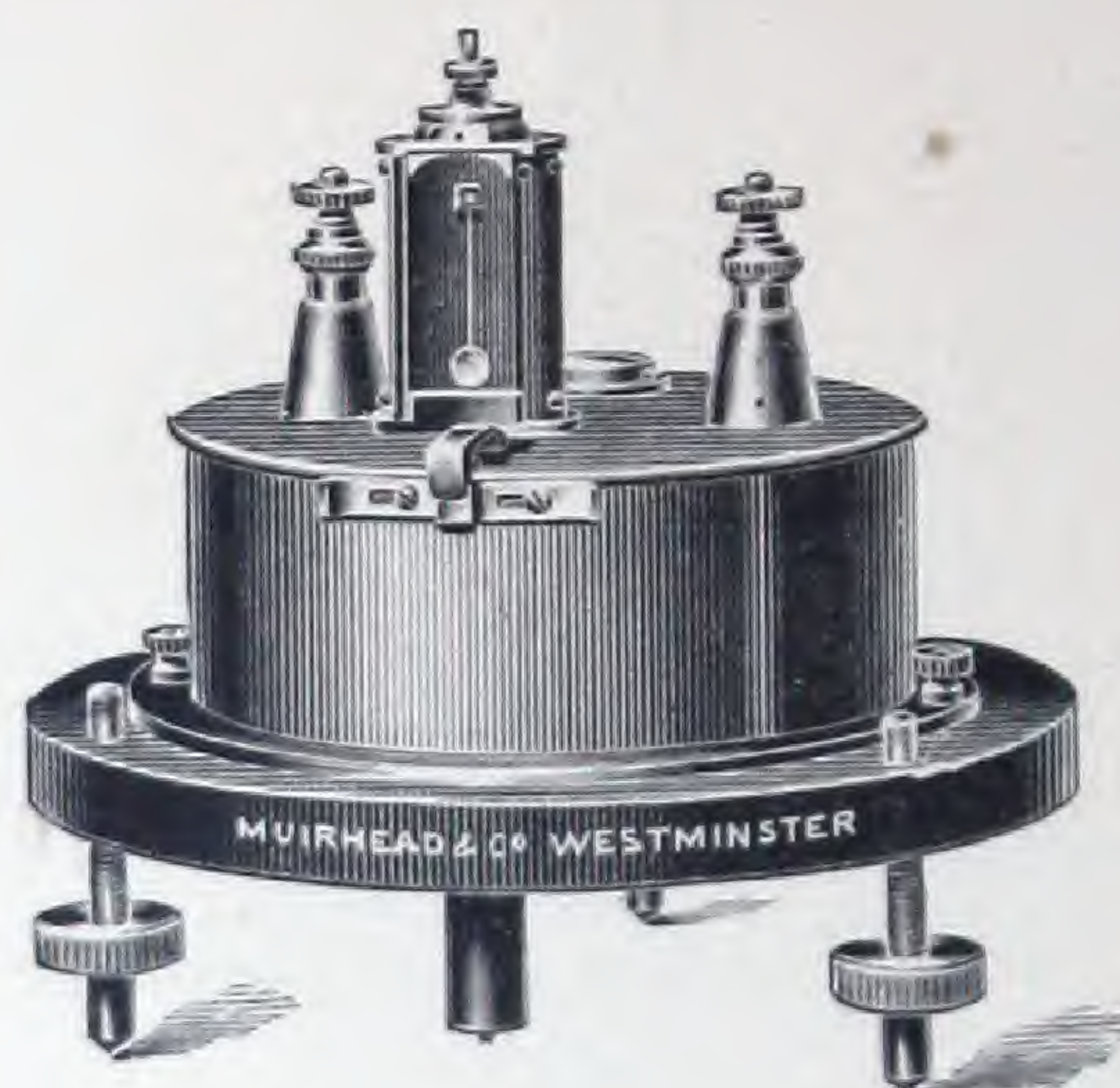


563.

- 565.—**Marine Galvanometer**, Thomson's, in stout iron case, complete, with set of shunts, lamp and scale ... 25 0 0
566. Ditto, ditto, with coils of high resistance, from 30 0 0
- 567.—**Thomson's Dead-beat Galvanometers**, mirror suspension, enclosed in a narrow chamber with glass sides, and mounted inside brass tube, the coils of the instrument can be of any required resistance ... from £8 to 12 0 0
- 568.—**Reflecting Galvanometer**, Thomson's, with set of shunts, oil vessel, lamp and scale, Government pattern ... 11 0 0
- 569 —Ditto ... ditto, Kohlrausch's ... 11 10 0
- 570.—**Differential Galvanometer**, Latimer Clark's double-shunt, complete with shunts and key 12 0 0

571.—Ditto, same as No. 570, but with needle supported by a silk fibre suspension 13 0 0

573.—**Suspended Coil Reflecting Galvanometers**, Deprez-d'Arsonval and other patterns. These instruments are recommended to Electricians at cable stations for rapid copper resistance measurements. Suitable also for insulation testing. The Suspended Coil is extremely dead-beat ... from £8 8s. to 12 0 0



572.

574.—Ditto, H. A. Taylor's form, with shunt arrangement for damping 18 0 0

575.—**Ballistic Galvanometer**, Professor Clerk Maxwell's

576.—**Electrodynamometer**, Siemens' ...

577.—Ditto, Kohlrausch's ...

578.—**Set of Shunts for Galvanometers**, $\frac{1}{9}$, $\frac{1}{99}$, $\frac{1}{999}$, the resistance of the galvanometer coils 3 10 0

579.—**Repair Box** for No. 573, containing reel of phosphor-bronze strip, small soldering iron, tweezers, spare mirrors, &c. 1 10 0

579A. **Spare Coil and Suspension Piece**, for No. 573 3 10 0

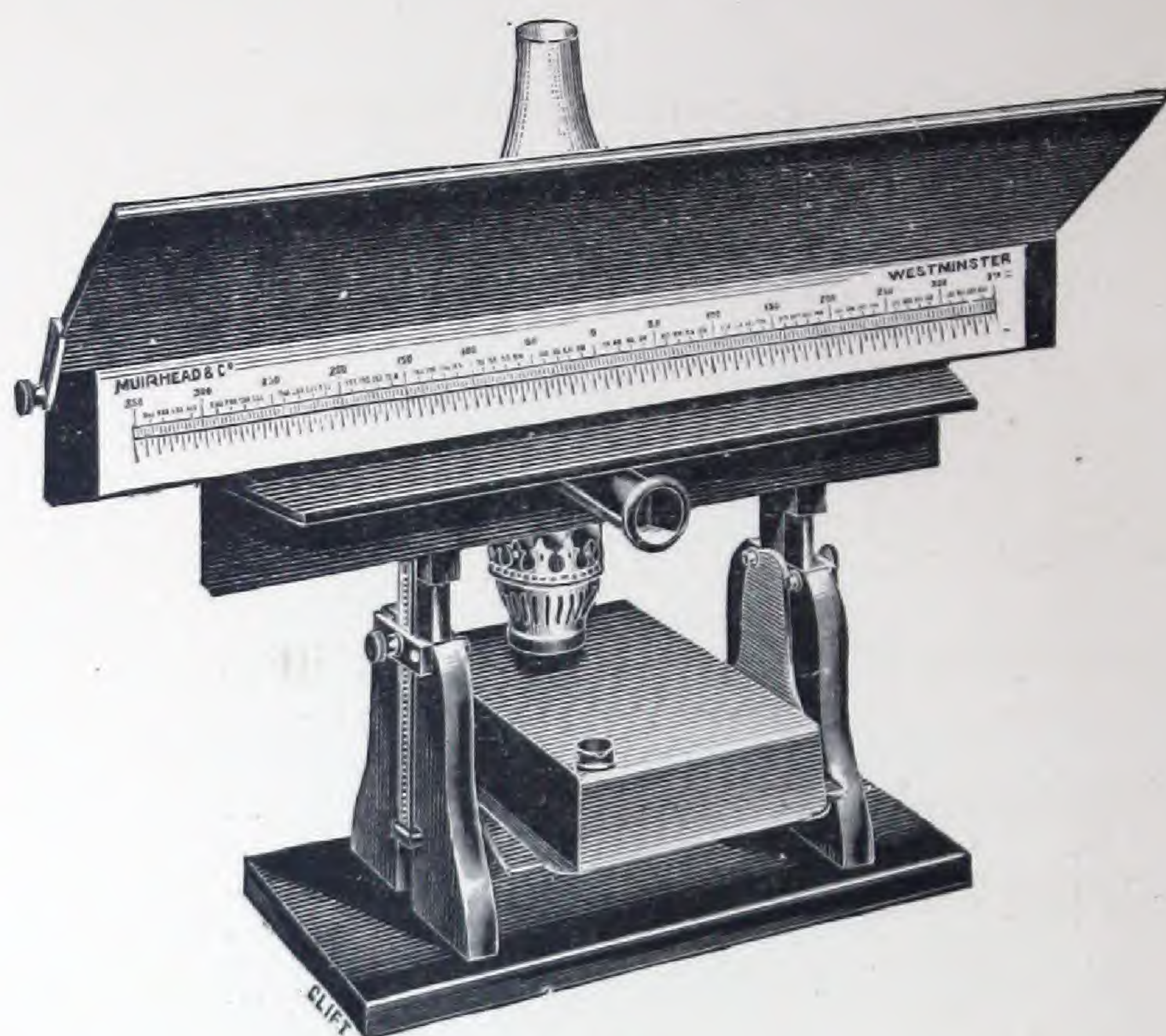
- 580.—Set of Shunts for Galvanometers, $\frac{1}{9}$, $\frac{1}{99}$, $\frac{1}{999}$, the resistance of the galvanometer coils, extra well insulated 4 15 0



580.

- 581.—Set of Shunts, P.O. pattern 3 15 0
- 582.—Sliding Shunts for large Marine Galvanometers 18 0 0
- 583.—Concave Mirrors, light, 3 to 4 feet focus, for Reflecting Galvanometers, from $\frac{3}{8}$ to $\frac{1}{8}$ diameter 0 3 0
- 584.—Mirror Slides for Marine Galvanometer, each 1 1 0
- 586.—Air Dead-beat Tubes for Reflecting Galvanometers, each 1 0 0
- 587.—Condensing Lens, mounted in telescopic tube, with slide on adjustable stand 2 2 0
- 588.—Lamps for Reflecting Galvanometers, each 0 10 6
- 589.—Lamp Stand and Adjustable Scale, with lamp complete 2 10 6
- 590.—Ditto ... ditto, with rack and pinion fixed to scale 2 17 6

- 591.—Ditto ... ditto, with screen lamp and lens
throwing a round light spot with vertical dark
line and clamping arrangement at sides for
supporting lamp and scale in position after
adjustment ... 3 7 6



591.

- 591A. **Lamp Shade**, cylindrical, fitted with lens for
Reflecting Galvanometer
- 592 — **Cardboard Scales** for Reflecting Galvano-
meters each 0 1 0
- 593.— **Semi-Transparent Scale**, with adjustable
stand for Reflecting Galvanometers ...from 2 15 0
- 594.—Ditto, for use with Electric Lamps, mounted on
strong cast iron base 8 10 0
- 594A. **Reading Telescopes**, with scales for use with
Reflecting Instruments ... from £5 to 25 0 0

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

ELECTROMETERS.

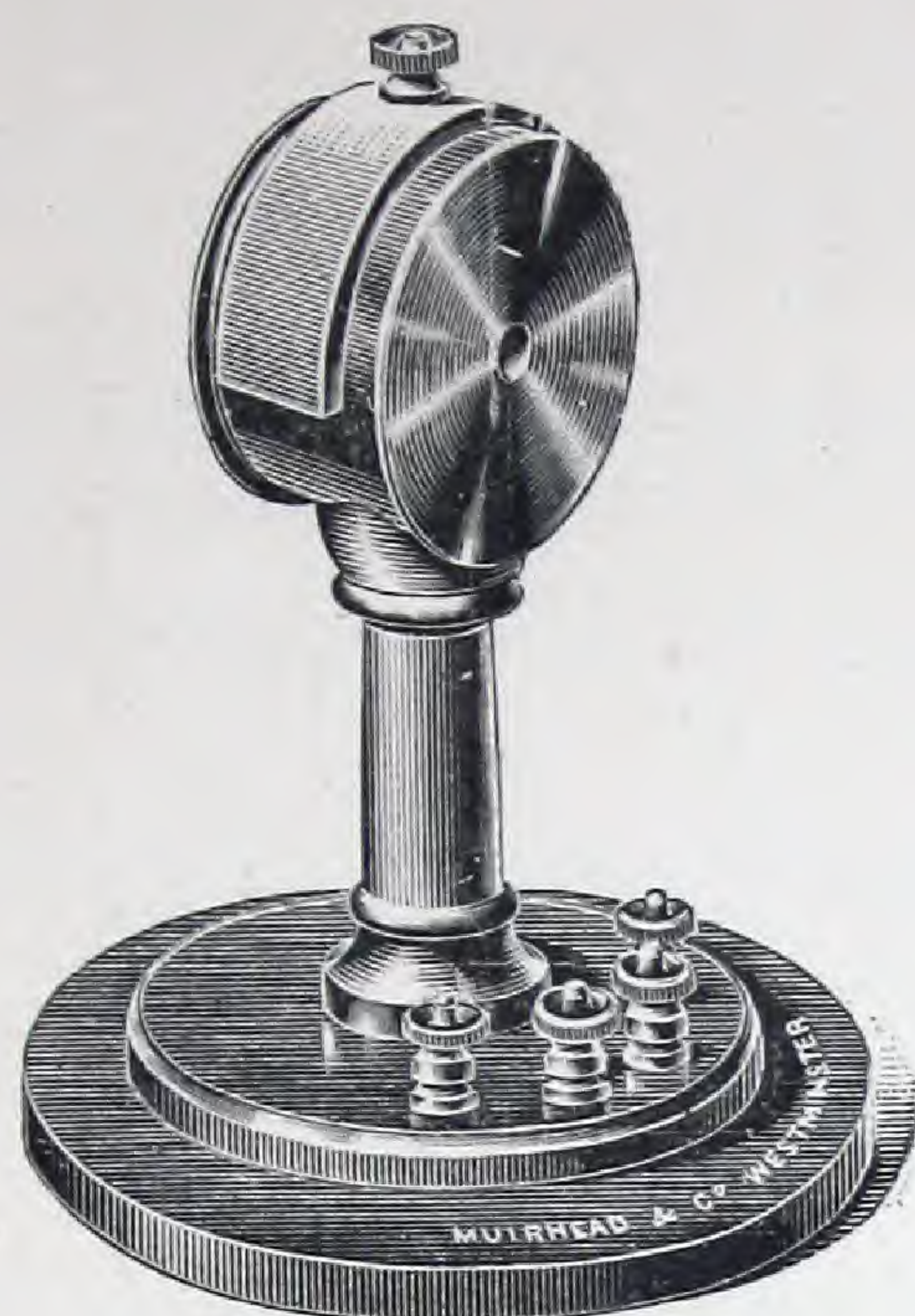
595.—Thomson's Quadrant Electrometer	...	35	0	0
596.—Ditto	Portable „ ...	12	12	0
597.—Ditto	Absolute „ ...	75	0	0
598.—Thomson's Quadrant Electrometer,	Lecture form	6	10	0
599.—Ditto ... ditto, Ayrton and Edelmann's	modification	13	10	0
600.—Replenisher for use with Quadrant Electro-	meter			
601.—Electrophorus, ditto	... ..		
602.—Peltier's Electrometer	... ..	3	10	0

SECTION VII.

APPARATUS FOR SUBMARINE CABLE WORKING.

605.—Siphon Recorder, Thomson's with electro-magnets, tools, spare siphons, &c.	95	0	0
606.—Ditto ... ditto, with permanent magnets, tools, spare siphons, &c.	75	0	0
607.—Ditto ... ditto, with permanent magnets, without electrification or siphon vibrator, with tools, spare siphons, &c.	50	0	0
608.—Vibrator and Slide Resistance, as used by the Eastern Telegraph Company with recorders	10	10	0
609.—Recorder Switch	4	4	0
610.—Tray Batteries, complete per cell	2	0	0
611.—Aniline per bottle	0	12	6
613.—Speaking Mirror Galvanometer, Thomson's (coil from 1,000 to 2,000 ohms resistance)	7	15	0

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.



613.

614.—Ditto ... ditto, three circuits, each 400 ohms resistance, with two spare plain mirror tubes, lamp, lens, and scale stand, complete...	10	10	0
616.—Ditto ... ditto (coils from 1,000 to 2,000 ohms resistance), with mirror suspended in either an air dead-beat tube, or a water tube, with lens lamp and scale stand, complete ...	11	10	0
617.—Ditto ... ditto, with coils differentially wound for duplex working ...	13	0	0
618.—Judd's Adjustable Soft Iron Core, with mirror tube complete, for enlarging the signals of mirror speaking instruments ...	1	10	0
619.—Spare Mirror Tubes ...	0	10	6
620.—Lamp Apparatus, for speaking galvanometers, consisting of lamp with copper chimney, lens mounted on adjustable brass stand, and scale stand ...	3	15	0
621.—Concave Mirrors, with from 3 to 6 feet focus for speaking galvanometers ...	0	3	0
622.—Box of Spare Mirrors, fitted with magnets, silk fibre, wax, &c., for speaking galvanometers	1	0	0

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

631.— Signalling Key , plain	2 10 0
632.—Ditto, Saunders' improved form	5 0 0
641.—Ditto, Sharpey Seaton's, with Switch combined, for use on cable ships	3 15 0
633.— Saunders' Automatic Cable Transmitters arranged to work by local electro-magnets ...	8 15 0
634.—Ditto ... ditto ... with Saunders' curbing device	10 15 0
635.— Smith's Single Switch for submarine cable working	7 0 0
636.—Ditto Double Switch for translation working on submarine cables	10 10 0
637.— Allan and Brown's Relay , large size ...	25 0 0
80.—Ditto ... small size, for short cables ...	9 10 0
638.— Signalling Condenser , capacity 20 microfar- ads, from £45 to 52 10 0	
639.—Ditto, capacity 10 microfarads, from ...	£23 to 30 0 0
642.— Recorder Paper	
645.— Wheatstone Transmitter , specially con- structed for use on cables, Taylor's form ...	
646.—Ditto ... ditto, Stonell's form, as used by the Anglo-American Telegraph Company ...	
647.—Ditto ... ditto, Wilmot's form, as used by the Commercial Cable Company	
648.— Perforators , with hinged cover, for use with Nos. 645, 646, and 647	8 10 0

Switch Boards and Terminal Boards for Cable Stations to specification.

SECTION VIII.

BATTERIES.

700.—	Muirhead's Copper Sulphate Battery,								
	ten cells, in teak boxes, with hinged lid and								
	brass terminals, complete	...	...	each		1	10	0	
705.—	Daniell Battery, round stoneware or glass								
	jars, round porous cells, zinc and copper								
	plates	...	...	...	...	each	0	3	0
706.—	Ditto	...	ditto,	trough form, 12 cells	each	1	0	0	
707.—	Ditto	...	ditto	„ 6 „ „	„	0	13	0	
708.—	Ditto	...	ditto,	globe reservoir form	each	0	5	0	
709.—	Ditto	...	ditto,	Minotti's form	each	0	3	6	
710.—	Marie Davy Battery; zinc and carbon,								
	mercurous sulphate in porous cell with								
	carbon	...	...	...	...	each	3	0	0
715.—	Bichromate Battery, zinc rod standing in								
	mercury trough, and carbon with mixture of								
	bichromate of potash and sulphuric acid, pint								
	size	...	...	...	...	...	0	2	6
716.—	Ditto	...	ditto,	quart size	...	...	0	3	0
717.—	Ditto	...	ditto,	three pint size	...	...	0	4	0
718.—	Ditto	...	ditto,	'bottle' form, pint size	...	...	0	5	0
719.—	Ditto	...	ditto	ditto quart size	...	...	0	7	0

610.—Thomson's Tray Batteries, complete, each	2	0	0
720.—Leclanche Battery No. 1., with porous pot, and glass jar			
721.—Ditto ... ditto No. 2 ditto ditto			
722. Ditto ... ditto No. 3 ditto ditto			
750.—Leclanche Batteries, 21 cells, in oak case, with connecting wires, and three electrodes for medical purposes	3	6	0
751.—Ditto, same as above, 30 cells	4	10	0
752.—Ditto ... ditto 40 cells	5	15	0
753.—Ditto ... ditto 12 cells, in oak case, with current reverser, commutator for varying number of cells, connecting cords, handles, and five electrodes, complete	4	8	0
754.—Ditto ... ditto 21 cells, same as above ...	5	18	0
755.—Ditto ... ditto 30 cells ditto ...	7	8	0
756.—Ditto ... ditto 40 cells ditto ...	9	0	0
Nos. 753 to 756 with galvanometer £2 15s. 0d. extra.			
757.—Dry Cells, Hellesen's patent, No. 1 size, 4 by 4 by 7 inches per cell ..	0	4	0
758.—Ditto ... ditto, No. 3 size, $2\frac{1}{2}$ by $2\frac{1}{2}$ by $5\frac{1}{2}$ inches per cell...	0	2	0
759.—Ditto ... ditto, No. 6 size, $1\frac{1}{2}$ by $1\frac{1}{2}$ by $3\frac{3}{4}$ inches, very useful for portable testing battery per cell...	0	1	6
760.—Portable Accumulator Battery, for cautery, two cells of five plates each, with rheostat and connecting wires. Capacity 40 ampère hours. Weight 50lbs. Size 7 by 9 by 14 inches	4	4	0
761.—Ditto ... ditto, similar to the above, two cells of seven plates each. Capacity 90 ampère hours. Weight 60lbs.	4	18	0

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

765.—Ditto ... ditto, for electric light, four cells, with rheostat and connecting wire. Capacity 18 ampère hours. Discharge current from one to four ampères. Weight 54lbs. Size 9 by 9 by 14 inches	4 4 0
770.—Chloride of Silver Cells, per dozen ...	1 10 0
771.—Ditto ... ditto, larger size „ ...	2 18 0
772.—Set of Chloride of Silver Batteries, with commutator and current reverser connecting wires, handles, and four electrodes for medical purposes, complete, 18 cells	5 5 0
773.—Ditto ... ditto, 24 cells	6 6 0
774.—Ditto ... ditto, 32 „	7 15 0
Nos. 772, 773, and 774 with galvanometer £2 15s. 0d. extra.	
778.—Set of Chloride of Silver Cells, in a mahogany or teak box, with five way commu- tator, for use with portable testing sets, 30 cells	5 0 0
779.—Ditto ... ditto, 50 cells	7 15 0
785.—Thermoelectric Battery, Noë-Dörffel's pat- tern, 20 elements giving 1.25 volts	2 5 0

Sulphate of Copper, Sal Ammoniac, Bichromate of
Potash, Chromic Acid, Mercuric Sulphate, Mercurous
Sulphate, Mercury, and other requisites for batteries.

SECTION IX.

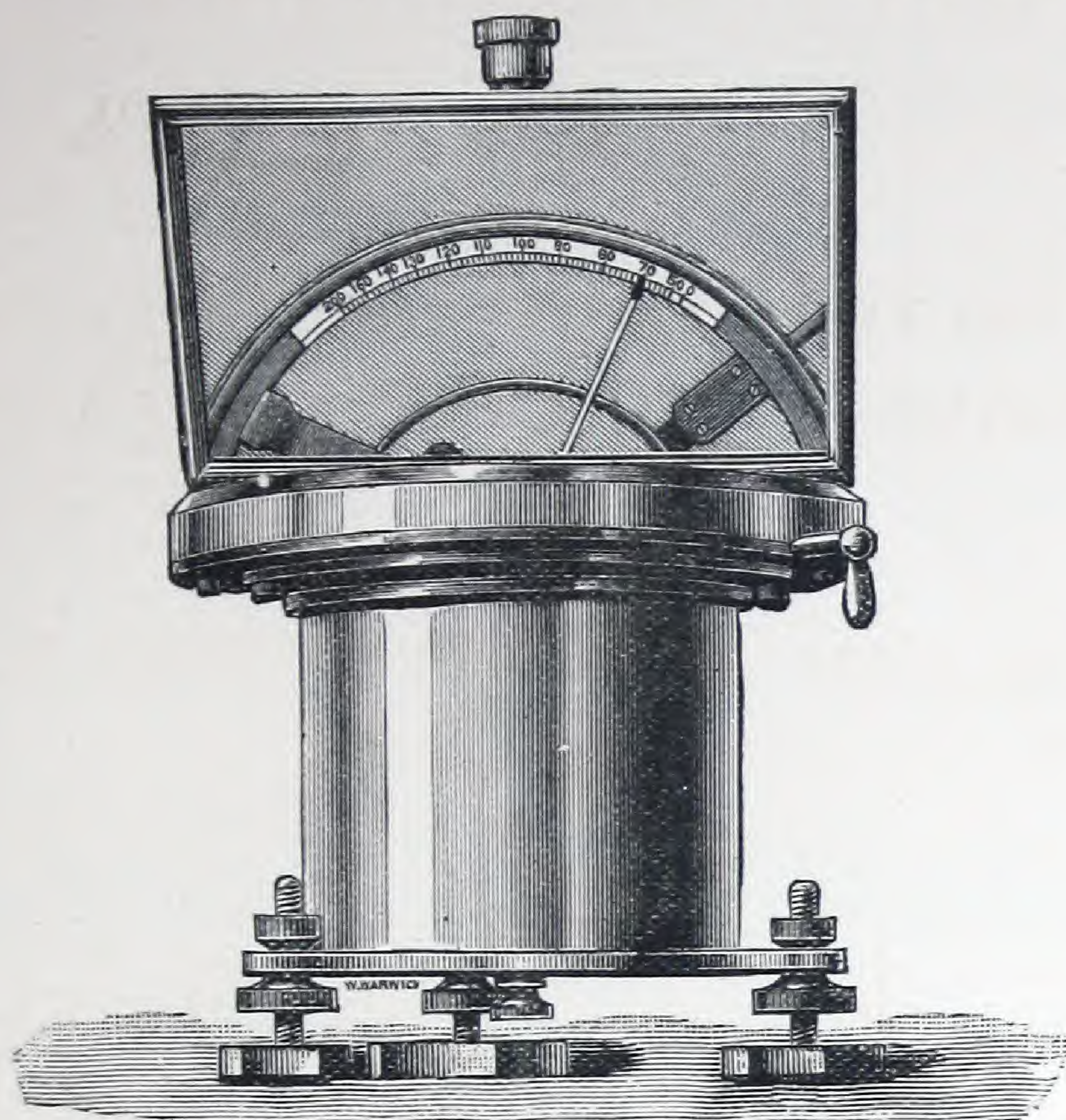
VOLTMETERS, AMMETERS, & MEASURING
APPARATUS FOR ELECTRIC LIGHT STATIONSSIR WILLIAM THOMSON'S (LORD KELVIN)
SPECIALITIES.

STANDARD ELECTRIC BALANCES.

801.—Centi-ampere Balance from 1 to 100 centi-amperes	30	0	0
802.—Deci-ampere Balance from 1 to 100 deci-amperes	30	0	0
803.—Deka-ampere Balance from 1 to 100 amperes ...	30	0	0
804.—Hecto-ampere Balance from 6 to 600 amperes ..	30	0	0
805.—Kilo-ampere Balance from 25 to 2500 amperes ...	37	10	0
806.—Composite Kilo-ampere Balance, can be used in conjunction with Deci-ampere Balance, to measure currents from 0·1 to 10000 amperes, or as Wattmeter	35	0	0
807.—Composite Balance, can be used as Wattmeter, Voltmeter, Centi-ampere Balance and Hekto- ampere Balance, to measure from 0·2 to 500 amperes	35	0	0
808.—Resistances for use with Centi-ampere Balance, and Composite Balance when used as Volt- meters	6	0	0

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

ELECTROSTATIC VOLTMETERS.



809.—Multicellular I	{	range, 40 to 160 volts	}	10	0	0
		best of range, 50 to 100	„			
810.—	II.	{	range, 60 to 240	}	10	0
		{	best of range, 70 to 130	„		
811.—	III.	{	range, 80 to 400	}	12	0
		{	best of range, 100 to 240	„		
812.—	IV.	{	range, 200 to 800	}	12	0
		{	best of range, 300 to 600	„		
813.—	V.	{	range, 500 to 1600	}	13	0
		{	best of range, 600 to 1300	„		
814.—Vertical Electrostatic,	I.	200 to 4000 volts		12	12	0
815.—	II.	400 to 8000	„	12	12	0
816.—	III.	800 to 12000	„	12	12	0
817.—	IV.	1000 to 20000	„	15	15	0
818.—Electrostatic Balance	I.	2500 to 50000	„	25	0	0
819.—	II.	5000 to 100000	„	35	0	0

With vulcanite sheath, and mirror to facilitate reading at a distance,
15s. extra.

AMPERE GAUGES.

820.—Ampere Gauge,	I.	0.25 to	5 amperes	...	6	0	0
821.— „ „	II.	1 to	20 „	...	7	0	0
822.— „ „	III.	5 to	100 „	...	8	0	0
823.— „ „	IV.	10 to	200 „	...	8	0	0
824.— „ „	V.	25 to	500 „	...	8	0	0
825.— „ „	VI.	50 to	1000 „	...	10	0	0
826.— „ „	VII.	200 to	2000 „	...	12	0	0

MAGNETOSTATIC AMPEREMETERS.

827.—Magnetostatic Milli-ampere-meter	...	...	10	0	0
828.— „ Centi-ampere-meter	...	...	10	0	0
829.— „ Deci-ampere-meter	...	...	10	0	0
830.— „ Amperemeter	...	...	10	0	0

MARINE VOLTMETERS AND AMPEREMETERS.

831.—Marine Voltmeter, 40 to 150 volts	...	...	8	0	0
832.— „ Amperemeter, I.	40 to 160 amperes		7	10	0
833.— „ „ II.	60 to 270 „		7	10	0
834.— „ „ III.	100 to 500 „		8	0	0
835.—New Engine-room Voltmeter, 70 to 150 volts.	...		8	0	0
836.—New Electricity Meter, range 1 to 80	...	...	
837.—Gold-leaf Electroscope, can be used as volt gauge to measure from 500 to 5000 volts	...	...	3	0	0

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

CONTINUOUS RHEOSTATS.

838.—Continuous Rheostat.	I.	{ 600 ohms platinoid wire to carry 0·5 ampere }	6	0	0
839.— " "	II.	{ 100 ohms platinoid wire to carry 2 amperes }	6	0	0
840.— " "	III.	{ 20 ohms platinoid wire, to carry 10 amperes }	10	0	0
841.— " "	IV.	{ 0·5 ohm copper wire, to carry 30 amperes }	10	0	0

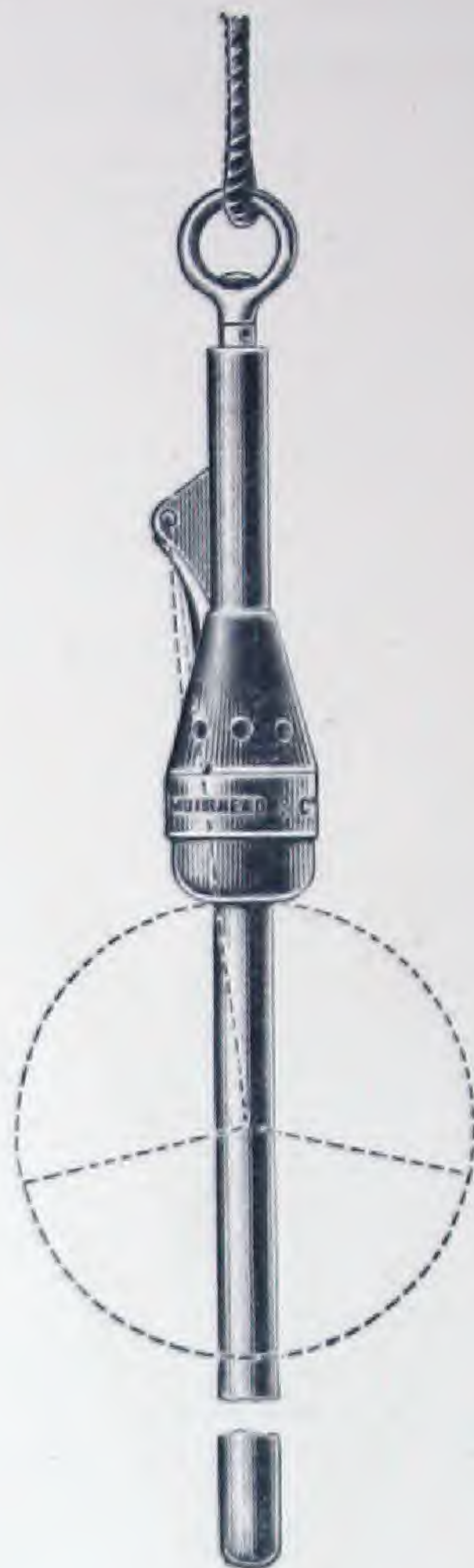
SECTION X.

STORES FOR SUBMARINE CABLE SHIPS
AND
MISCELLANEOUS.

1000.—Micrometer, or Decimal Wire Gauge, with Taylor's ratchet arrangement	2	5	0
1005.—Induction Coil, Du Bois Reymond's pattern ...	6	0	0
1050.—Cathetometers, to order			

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

- 1100.—Stallibrass' Sounding Tubes, with latest improvements 2 15 0



1100

Specially designed to bring up a deep sample of the bottom and not a superficial one, which may be only a slight and local covering over rock, and affords no reliable information as to the suitability of the bottom for a submarine cable.

The sinker is kept on until the slack sounding wire is picked up by the ship, and it is then, at a very slight strain, slipped. The tube is thus forced down until it reaches stiff ground, and the wad of this at its lower end invariably secures the soft mud or ooze above it.

The detaching arrangement is such that under no circumstances can it fail to detach the shot. When used in shallow water the shot is easily lashed and recovered.

The wire sling suspending the shot can be attached to the tube by a light lanyard, and used again and again. Its recovery will prove that the shot is kept on until slipped by the detacher, and that it is not released by the snapping of the sling on the tube striking ground.

For the preservation of the specimens of bottom, glass tubes 8 inches in length, fitted with a cork at one end and having a small air vent at the other, are provided, and the specimen is forced from the sounding tube into these intact, and when sealed up is permanently preserved.

- 1101.—Sounding Sinkers
- 1104.—Hearson's Strophometer or Revolution Indicator 10 10 0

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

- 1105.—Harding's Speed Indicator ... 5 5 0
 1106.—Young's Speed Indicator, portable form ... 4 14 6
 1107.—Ditto ... ditto, permanent form, from ... £6 to 9 0 0
 1110.—Stallibrass' Improved Centipede Grapnel

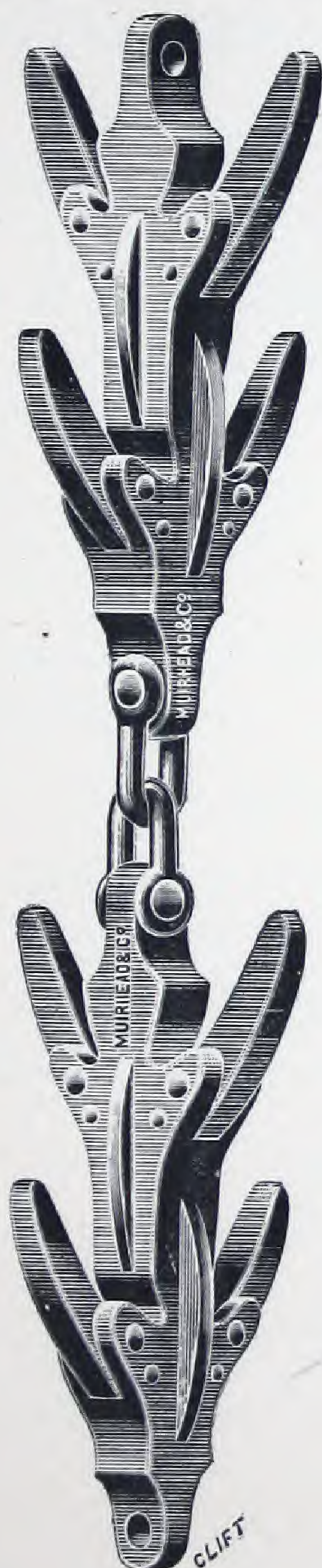
Patent grapnel designed to save breakage of toes by allowing them to shear a soft iron pin and capsize when the strain on the grapnel rope reaches to about 3 tons.

A toe when capsized projects rather more than before and thus the grapnel is canted over and prevented from towing with its disabled side down.

The grapnel is made in two parts, each consisting of 4 toes, and these can be shackled together directly or with a short length of chain between them. The advantages of this arrangement in the case of an irregular bottom are obvious.

The toes are made in two sizes suitable for either rocky or soft bottom and are interchangeable.

The cable when hooked rests on a large rounded surface, and is saved from damage. This resting place is on the shank of the grapnel, so that should a toe subsequently foul a rock and get capsized the cable is not lost.



1110.

MUIRHEAD & Co., STOREY'S GATE, WESTMINSTER, S.W.

1111.—	Grapnels —	Ordinary	...	...	...	...
1112.	„	Cutting	...	...	...	...
1113.	„	Boats	...	...	...	...
1114.	„	Holding	...	...	...	...
1115.	„	Improved	...	...	...	...
1116.—	Centipede —	Ships	...	...	...	...
1117.	„	Boat	...	...	...	...
1118.—	Spare Prongs —	Improved	...	...	...	...
1119.	„	for Stallibrass' Patent Grapnel				
1120.—	Blocks	for Improved Grapnels	...	...
1121.—	Rope	for Grapnels, 6 × 4, 6 × 3	...	...
1122.—	Mushrooms —	5 cwt., 3 cwt., 2 cwt., 1 cwt.				
1123.—	Buoys	...	...	...	...	...
1124.—	Beacons	...	...	...	...	...
1125.—	Staffs, Pins, &c.	...	...	...	...	...
1126.—	Blocks —	Wood, Double and Single, in various sizes	...	...	...	...
1128.—	Iron Snatch Blocks —	Wood	...	...
1130.—	Chains —	Fitted with link swivel and link $\frac{3}{8}$ in. to $1\frac{1}{8}$ in., 15 fms. lengths	...	...	...	...
1131.—	Bridle —	Fitted with link swivel and link $\frac{3}{8}$ in. to $\frac{7}{8}$ in.	...	...	...	...
1132.—	Riding —	$\frac{3}{8}$ in. to $1\frac{1}{4}$ in.	...	...	...	...
1133.—	Mushroom —	$\frac{3}{8}$ in. to $\frac{7}{8}$ in.	...	...	...	...
1134.—	Fittings —	Shackles, No. 1, 6 × 4 2, 6 × 3	...	...	...	...

MUIRHEAD & Co, STOREY'S GATE, WESTMINSTER, S.W.

1154.—Tools—Bow Saws, 14in. and 16in.	...			
1155.— „ Spare Blades	...	...	...
1156.— „ Marline Spikes	...	...	...
1157.— „ Prickers	...	...	...
1158.— „ Fids	...	..	...	...
1159.— „ Splicing Tongs	...	...	...
1160.— „ Sleeking „	...	...	...
1161.— „ Splicing Hammers	...	...	...
1162.— „ Rigging Screws	...	...	...
1163.— „ Lapping Wire	...	...	...
1164.—Toolchests—Fitters	...	...	...
1165. „ Smiths	...	...	...
1166.—Thermometer, for Cable Tanks,	...	from	0	5 6
1167.—Ditto ... maximum and minimum, with porcelain sides	...	...	0	17 6
1168.—Ditto ... maximum and minimum, mounted on board, with Mason's Hygrometer, complete, from	...	...	2	15 0
1169.—Clock, for making electric contact at each second			2	2 0
1170.—Electrical Recording Apparatus	...			
1171.—Electrical Chronographs	...	...
1172.—Magnetometers	...	... from	3	0 0
1173.—Heliograph, Elphinstone Begbie's	...	...
1174.—Ditto ... ditto, Mance's	...	from 9 9 0 to 22 10 0		

SPECIALITIES.

CONDENSERS.

STANDARD CONDENSERS.

STANDARD CELLS

[Dr. Muirhead's Patent Portable Form, as supplied to the Board of Trade.]

CONDENSERS, for alternating Current Circuits.

POTENTIOMETERS, for comparing E.M.F.'s.

PORTABLE TESTING SETS

For Electric Light Engineers.

SUSPENDED COIL GALVANOMETERS

(Ayrton-Mather, Deprez-d'Arsouval, and other Forms.)

TESTING KEYS, RESISTANCE COILS, THOMSON and VARLEY'S SLIDES

(Muirhead's Portable Form and other forms.)

GALVANOMETERS, ELECTROMETERS, VOLTMETERS, AMMETERS, and other Apparatus required for Electrical Testing.

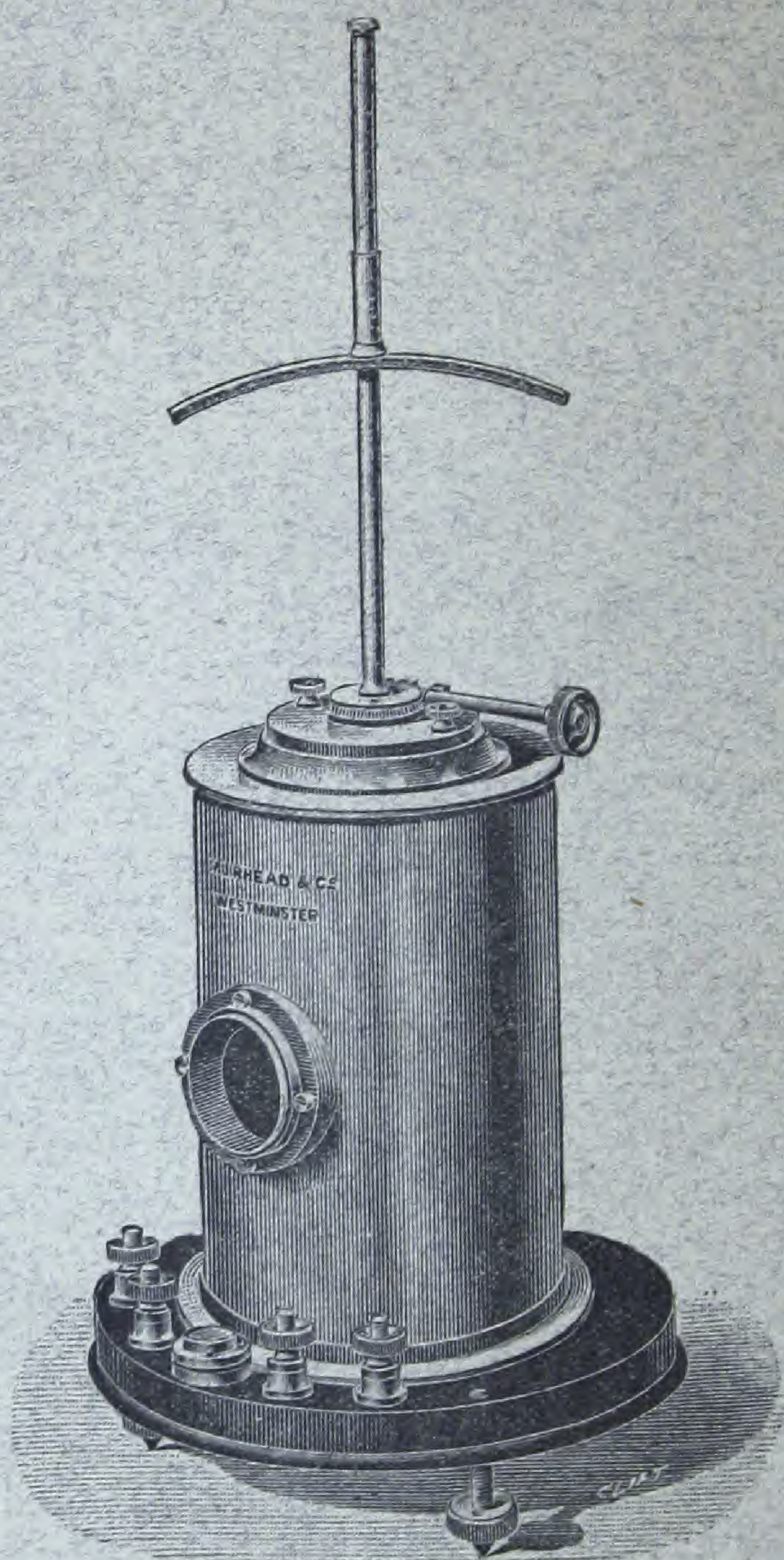
APPARATUS for DUPLEX TELEGRAPHY on SUBMARINE CABLES

(With Dr. Muirhead's latest Improvements.)

MUIRHEAD'S INDUCTIVE RESISTANCE for Duplex Telegraphy.

APPARATUS for AUTOMATIC TRANSMISSION on Submarine Cables.

LIGHTNING GUARDS, (Lodge's, Saunders', and other forms.)



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CCA